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JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

VOL. XXXV. 1909.

PART I.

THE CULTIVATION OF FRUIT IN BRITISH COLUMBIA.

By Mr. H. HINCKS, F.R.H.S.

DURING the last few years much attention has been attracted to British Columbia as a country to which to turn with a reasonable prospect of making a living, on account of its fruit-growing capabilities. In no small degree has its fruit attracted the attention of the many who have not an "opening" at home, but in no less a degree has it attracted the notice of the few who look for good fruit to eat and have a difficulty in getting it.

Many have seen the fruit at the Royal Horticultural Society's shows, but comparatively few have ever tasted it; and the taste of an apple, as in the very earliest days, is still a temptation, heightened when its equal does not often find its way into the shops of fruit-dealers.

British Columbia, not, I venture to think, without deserving it, is becoming a place to look to for fine fruit, and for a pleasant life in the growing of it—a life full of hard work certainly, but one in which, if not a fortune, at least a comparatively safe income may be earned; a life healthier than in an office and congenial to those who like to work with their hands.

It is often said that people should have gone there to grow fruit five or six years ago, but, from what I have seen, the object lessons which can be learned from looking at mistakes made in the varieties planted, and the way in which they were cultivated, almost entirely compensate for the time lost. The indifferent varieties planted in the early days of fruit-growing, will, as time goes on, have to give way to the fine varieties of the future. The poorer varieties are bought now only because no quantity of the finer ones can yet be obtained.

The following are points which are worthy of the attention of any one thinking of starting fruit-growing:—

1. See all the land you can before buying anything.
2. Be sure that it is fruit-growing land which you do buy.

3. Beware of land subject to floods—looking and enquiring for the highest point ever reached by river or lake.

4. In buying, keep the price low, and remember what the land will cost by the time it is cleaned and ploughed. The higher price is no criterion of quality, but rather of fashion in land, where living is more expensive.

5. See outlying districts, rather than buy land which has been picked over by many before you came.

6. Remember that land fit to plant must be such as may be ploughed in any direction. Do not plant in an excess of potash, and when planted keep your ranche properly cultivated.

7. Plant only the best varieties of apples.

Dry months occur all over British Columbia, and it will be found that July and August are times when a lack of moisture will check the growth of the trees in their early stages, and in some orchards bad results from insufficient moisture are even now apparent. To avoid this some system on the lines given below will have to be adopted :—

1. Irrigation.
2. Dry cultivation.
3. Relying on "seepage."

Irrigation is a troublesome system in an orchard, for while land is being irrigated it needs constant attention, and even then more or less bad "wash-outs" will take place.

In the opinion of many it detracts from the flavour of the fruit grown, and it stands to reason that by this system much plant food must be washed out of the ground. Irrigation must tend to bring the roots of the trees along the line followed by the water, rather than equally distributing them around the stem, and thus less plant food is available, by limiting the area from which the tree derives its nutriment.

Water in British Columbia always costs money in some way or other, and dependence on irrigation must be counted as an extra expense ; it is either put on to the price of the land, when bought, or it is collected yearly as a rent, or you find your own water supply when you "stake" out your land and convey it to your orchard. It also costs money in the labour necessary while irrigation is being carried out.

Dry farming necessitates the constant stirring of the earth, and keeping the surface of the soil dustlike in fineness, and this condition can only be arrived at by constant cultivation, which therefore means constant labour. The summer heat tends, in a climate where dry farming obtains, to the premature ripening of the fruit, and greater risks have to be incurred when an orchard is first planted.

In these regions the hot summer climate is as a rule followed by a severe winter, and so there is a limitation of the varieties which can be successfully grown, and this means the elimination of the finest varieties of dessert fruit.

Natural moisture, or "seepage," can only be found in sufficient quantity to be serviceable at the foot of very high hills, thus limiting the area of cultivation and affording only small fruit-land areas near rivers and lakes.

But this is surely the most natural way to grow fruit, as here there is no washing of soil, no loss of plant food, no extra labour. Its only drawback is the comparatively small area on which sufficient seepage can be found —namely, where the immediately surrounding hills are high enough to feed the lower lands with moisture from melting snow, and where the land is not too rocky, or liable to flood, to make fruit-growing practicable.

Reviewing the districts, each one has its peculiarities, from drought on some of the western islands to the damp and lichens of the coast, through the hot reaches round Pentiction and Keremos, through the erstwhile land of scrub round Okanagan Lake, to the timbered lands of West Kootenay, and on to East Kootenay's parched valleys. Some parts are well settled and others contain only isolated ranches. In the more settled places land has risen in value until it is almost beyond the reach of the average settler, whereas in the more easterly parts it can be bought for a quarter the price—land standing in timber, it is true, but land which has supported fine forest trees, and which will support fine fruit trees if the climate is not too severe. The chosen site of nature's forest is better suited to the growth of fruit trees than land unable at one time to support more than sage-bush and greasewood, forced out of a dryness too great for timber into an orchard grown by artificial irrigation.

Heavy clearing characterizes the land near the coast, light clearing in and about the Okanagan and Kettle River Districts, and medium clearing in the Kootenays. The cost of clearing an acre of land ready for the plough ranges from 50 dollars to 500 dollars, according to the district.

In travelling about British Columbia I was struck by the fact that in most cases ten acres (a one man's orchard) was all the land a man had. His future firewood was not considered. During the first years, tons of wood in timbered districts were burned to get at the soil, and I feel sure that a few years hence the complaint of the lack of cheap fuel will be great. The man is wise who in starting on timbered lands saves all the wood he can for fuel, and I would go still further and say that he should, if possible, acquire cheap adjoining land unsuited for fruit from which he can get his future fuel. I would also advise him to go to the lesser known parts to start his orchard, for if good land is chosen, with means of transport for fruit, there is no fear but that in due time neighbours will come. I have in mind parts of the West Kootenay District where good land may be bought at a reasonable figure, and a steep piece of hill-side bought to yield fuel. In the process of clearing timbered lands and burning large quantities of wood to get at the soil an excess of potash is formed, and clover crops grown and ploughed in are a necessity to bring back the nitrogen. In many cases the dense timber has excluded the sun for generations, and time which is given for the sun to sweeten the soil after clearing on these lands is time not wasted, but well spent. Often the neglect of such things as clover and sunshine results in disappointment in the early stages of an orchard.

Again, the stumps of trees are too often left in the ground in the race to get a piece of land planted, and these are always in the way, difficult to pull out and impossible to blow out after an orchard has been planted, except by sacrificing the fruit trees, and if left in the ground they interfere with the yearly cultivation of the ranche.

So far the idea—one might almost say the rule—has been to plant many varieties and a few of each. But, looking at the business-side of it, shipments must, if they are to be made successful, be made by carloads, not by boxes, and in choosing varieties plant, say, three or four varieties for selling on ten acres, so that their picking will not come at the same time, and so that you may sell quantities of the same fruit off your own orchard rather than be compelled to hunt for somebody with the same variety (whose apples may be better or worse than your own) in order to make up a consignment.

In the choice of varieties of course the best dessert is the highest priced apple, but some of the best varieties are shy bearers, or poor pollen-producers, and remember in making your selection that most of the Government's excellent pamphlets are taken from experiments carried out in other provinces, or in the States, and in neither case is the climate the same nor are the soil and conditions similar to those which are found in British Columbia. For in a large province like this the different districts themselves vary enormously in these respects.

Peaches, strawberries, apples, and a variety of other fruits are grown in British Columbia, but it depends entirely on transport, markets, and the locality as to which will be the best business proposition.

In very few cases can one rely on the nearest town for the sale of all the fruit grown around it; but the Prairie on the east and Australia on the west are places where fruit is wanted and where it will sell.

Each year more settlers come out to Canada, and a large proportion of these go to places where fruit cannot be grown, increasing the numbers of miners, farmers, &c., who have to buy their fruit. At present we read that not half of the fruit consumed is raised in the province, yet some of this fruit, such as oranges and lemons, must be imported, and although there seems every probability that the demand, which is at present good, will continue for fruits which will travel long distances, yet local markets only can be relied upon for the "soft" fruits, and such demands are not large.

I would say in conclusion that there are many things which if run in conjunction with an orchard will help to tide over the five years of waiting until the bearing stage is reached, without growing such fruits as strawberries. Honey, eggs, and milk are all profitable, and, given energy and good business instincts, British Columbia has openings for many. Perhaps the most difficult decision which you are asked to make is in the selection of the land on which to make not only an orchard but with it your home.

FRENCH GARDENING.

By Mr. C. D. Mackay, F.R.H.S.

[Lecture delivered January 5, 1909.]

For many years I have advocated the growing of early salads in the way used by the French gardener or maraicher, but until recently only one or two such gardens had been started. Within the past year intensive cultivation has excited an enormous amount of interest among the leisured classes and among those who have gardens and gardeners of their own, and to these I more particularly wish to speak. Now that they have been awakened to the simplicity of growing early salads in their own gardens, they wonder why they have not attempted to supply themselves instead of being dependent on the foreigner as in the past. They had seen the gardens round Paris and marvelled at them, but they were under the impression that in our climate such methods as are there employed were doomed to failure, whereas there is virtually but very little difference, in fact only about two degrees in temperature, between Paris and London, and although they do not have the black fogs we do, they certainly have damp white ones.

The cry in the past has always been that our climate is not the slightest good for growing vegetables in the manner adopted in France, and that in France they have no frost, fog or snow, and no other difficulty to contend with, in rearing the plants. Of course this is not the case. The French gardeners who have had experience in this country say that the climate here is good, and that the lettuces did not "fog off" as they do in Paris.

Perhaps gardeners in this country have also been to blame, in that they have religiously adhered to their old-fashioned ideas. They knew only by hearsay of the wonderful way in which the French grew their early salads, and although their employers may have seen the methods employed and the results obtained, yet the gardeners had no opportunity, and possibly no desire, to see for themselves, and they foolishly condemned a system which they did not understand.

One essential must always be borne in mind: when gardeners attempt the system they must have the right varieties of seeds to grow, and it must not be thought that our usual varieties of lettuces, carrots, &c., are just as good as the proper varieties.

Ours really is a most favoured country, especially in the South and West, for this kind of intensive cultivation, and there should be no necessity for the huge quantities of lettuces, carrots, radishes, &c., to come from any foreign country as they do now. Actually lettuces are *now* (January) coming in from Paris and are realizing good prices, and why? Simply because our growers are so lethargic and non-progressive that they will not believe it possible to work the system successfully here; neither is it, unless they adopt the same methods as the French people;

these methods I will endeavour to explain a little later on. One thing, however, I am grieved about, viz., that a few people, who would practically not make a success of anything, have been lured by the golden prospects held out to them in certain sections of the Press, into embarking in an attempt to secure, from an outlay of £100 to £200, the comparatively enormous income of £400 or £500 a year. This, too, simply because they may have read a newspaper article, or my book on French gardening. For instance, I have been in communication with engineers, clergymen, and many other professional men who have had long years of training for their particular professions and who cannot make a successful living, but they think that with possibly £200, the amount mentioned in my book as possible, they are immediately going to make a good living without having the slightest idea of the method of work. I asked an eminent surgeon the other day if he thought that by reading a book upon surgery I should be able to operate successfully on any one. He said he would not care about my doing so on him at any rate, and I retorted that neither could a man by simply reading a book become a skilled gardener.

I am also sorry to see that the public are being asked to subscribe to large ventures of this description. Personally I do not think that French gardening on a large scale is to be advocated. The methods are suited to small gardens of one to two acres only, and such gardens require the unremitting and assiduous care of the proprietor himself. The name which has been coined for the system, "intensive," is a very apt one, for it is not, and can never be, an extensive one.

About fifteen years ago it occurred to me that there was no reason why we could not grow lettuces here, just as they did in France, and in conversation with an eminent French seedsman I learnt that it was the variety of lettuce which enabled the French to achieve such seeming wonders. I promptly got some of the seed, giving it to some of my English friends, but it was a failure. Going somewhat further into the subject I found that the seed was *not* everything, but that the way the plants were cultivated was also an important factor, and the cultivation is somewhat as follows. The French maraicher, and now the English gardener, begins to collect his manure from July onwards, storing it in great heaps. This he keeps until he requires it in December and during that month he collects an equal quantity of fresh manure.

This is then mixed in equal quantities and spread nine inches deep on the ground, and on the top of this the frames are placed. About six inches of soil is added to the top of the manure, and on this are sown radishes and carrots in January. Lettuces are planted in the frames at the beginning of January, and are cut towards the end of February. Lettuces are not required in this country very early.

The particular cabbage lettuce grown is one that has never been used in this country, except in the few French gardens now existing. It is quite distinct from any lettuce which we are in the habit of growing. If this lettuce is planted in the spring time, it will immediately run to seed, but if sown in October under cloches, the plants soon come up, and after a few days they are pricked out, twenty-five under a cloche, and left until they are wanted to finally replant in the beds in January.

It is astonishing that there are 2,160,000 cloches used in the immediate neighbourhood of Paris, and that there are also 1,000,000 lights devoted to the same purpose. The vegetable produce from these lights fetches the enormous sum of £500,000.

The straw mats which are used for this kind of gardening, or any other if necessary, do not absorb the wet like an ordinary Archangel mat, but allow the water to run off, and they quickly dry and are easily rolled up.

Cos lettuce, which is, if anything, more easily grown than the cabbage variety, is a splendid crop for paying when got into the market before our English outdoor ones are ready. They have to be raised at the same time as the cabbage lettuce, and pricked out in cloches, 25 to the cloche, but instead of being put under lights as the cabbage lettuce is, they must be planted out in small beds under cloches. Under each cloche one cos and three cabbage lettuce are planted, and over the whole of the ground carrots, such as have been sown in the frames, are sown.

On the outside of the cloches small-sized plants of another variety of cos lettuce, grown especially for the purpose, are planted to be coming on, and as soon as those under the cloches are cut, those outside are ready to have the cloches moved on to them to get a second crop.

Of course it would be absurd for everyone to start a French garden, either small or large, but it will be a long time before enough gardens are in working order to supply our wants. I most strongly urge those who wish to go in for French gardening to have a French expert. It is the cheapest in the end, as he can make his wages with extra crops at times when an English gardener would not dream of trying to get them.

I am no advocate of market gardeners rushing to invest large sums of money before they have gained the requisite knowledge, but they can start in a small way, and whatever money they expend will not be lost, as both the cloches and the frames are admirably adapted for other methods of cultivation, and I had this class of men in view when I mentioned an outlay of £200 as being all that was required for starting a French garden.

It is a pity that those interested in this or any other particular kind of gardening do not go and see the methods of our French, Dutch and German friends for themselves. None is so perfect that he cannot learn something, and if we go with unprejudiced minds we shall pick up ideas which may lead to the improvement of their own system.

Now the Dutch are if anything slower than we are in taking up new ideas, but they have started growing early vegetables and salads round the Hague, and they do it extremely well.

In our own country we have an enormous population, and a population who can afford to go to Paris for these delicious early vegetables. It is only necessary to educate people up to the fact that they can obtain them in England, and, moreover, that they can have them fresh either at lunch or dinner cut the same morning, instead of being sweated in boxes coming from France, taking three or four days over the journey, then possibly lying in a shop window for two more days until sold.

In advocating the growing of early vegetables in England please do not misunderstand me. This is no golden road to riches. In growing these vegetables, hard work year by year is the only means of gaining success. It is true we may "French garden" here, but it is also true that it entails very hard work.

"Golden soil" is very alluring, and the gross profits of a concern run on the lines indicated merits the name, but only the indefatigable toil of a French maraicher devoted to it will make it a success.

It may interest you to know how many of these lettuces, &c., are sent every day from February to April to London. The usual consignment every day is four to five thousand crates of lettuces, 500 crates of small early carrots, 100 crates of asparagus, 100 crates of long French turnips, and 50 crates of celeriac.

Do not these figures give you some idea of the importance of this method of gardening?

People say that this gardening will soon be overdone. I do not think this will be the case. At the present time the prices of lettuces and carrots in the very early spring are prohibitive to all but those who are fairly well off; but if by production one can cheapen them so that they come within the reach of everybody, the present quantity of 5,000 crates of lettuces a day will speedily jump to 20,000.

These particular lettuces are sold by the French gardener to a middleman at 6*d.* a dozen all through the season, the growers themselves do not ship anything to England. If the French gardener gets 6*d.* a dozen he is quite happy, and it pays him well, and I have seen no French gardens which do not look as prosperous as they can possibly can be.

As you all know, here there will be no difficulty in getting 1*s.* to 1*s.* 6*d.* a dozen, even if they are what you consider to be low in price.

Many will remember the time when tomatos were grown only to a very small extent, when they fetched a high price. When the Canary Islands and other early places began to send in their tomatos, it was thought that it would kill the English trade altogether, but has it? I should say that at the present day there are two to three cwt. of tomatos grown where one pound used to be grown years ago. They are one of the most paying crops, no matter whether grown inside or out of doors.

When Guernsey began growing tomatos, did they suppose for one moment that thousands of baskets would be sent away every week? Why should not this success be reflected in a partial way for these lettuces and other produce?

I advocate growing strawberries under glass, not in green houses in the ordinary way, but in frames such as are used for this particular style of gardening.

As you know, strawberries when they first come in from the open ground are sold for anything from 9*d.* to 1*s.* 6*d.* per lb., and if they had been brought on earlier by being covered with lights they would have sold for double that price, and at this price they are a very paying crop indeed.

THE EFFECTS OF GROWTH AS SEEN IN CERTAIN MOVEMENTS OF PLANT-ORGANS.

By Rev. Professor G. Henslow, M.A., V.M.H., &c.

[Lecture delivered April 6, 1909.]

Introduction.—One of the most prominent effects of growth is the resulting movements of plant-organs. Though the most obvious characteristic of plants in general is that they are fixtures in the soil; yet, probably all the higher plants, at least, have their growing parts more or less in motion for a time. In some cases of microscopic aquatic organisms, the whole being is in motion in the water, as, *e.g.*, diatoms, Oscillatorias, and the zoospores of Algæ. It is not known for certain how the first two * effect their movements, but they are in some way dependent on the properties of protoplasm; the third are provided with protoplasmic cilia, and these are obviously the instruments of motion.

There are also numerous movements of protoplasm within cells, especially when the process of cell-division takes place. The well known "streaming" and "rotation" are continually going on and well seen in *Chara*; but these will not concern us now.

Other movements of organs are also the result of forces *within* the cells, and not the direct consequence of external agencies; some of these will be referred to; but it is especially the movements resulting from stimuli of the surrounding physical conditions of life which I propose to deal with.

As soon as plants begin to grow, their organs are subjected to, and respond to, various external stimuli; and the problem is to detect which is, or are—as there may be more than one—acting upon any organ at any one time. The chief influences are (1) light and (2) shade; *i.e.*, really, varying degrees of light till perfect darkness may occur. (3) Varying degrees of heat and cold. (4) Moisture in the air or soil. (5) Gravitation, always acting in a direction perpendicular to the earth's surface. (6) Contact with a resisting surface. (7) To the preceding may be added the internal influence of cellular growth, which produces external movements of growing shoots.

Organs may be developed under these influences without movement; but if their positions be altered, they will move or turn towards the source of the influence.

Both the *tendency* to respond to any of these influences may become a fixed and hereditary character, and take place when the original exciting influence is absent; and the *structure* itself caused by response may be, and usually is, hereditary as well; so that it may be formed completely or partially *previous* to the commencement of the action of the stimulus which had originally given rise to it.

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* See *Cryptogamic Botany*, by Bennett and Murray, pp. 422 and 442.

The terms I propose using to express the "turning" towards the stimulus are as follows: (1) Phototropism (to diffused light), and Heliotropism (to the sun); (2) Skototropism (to shade or darkness); (3) Thermotropism (to heat); (4) Hydrotropism (to moisture); (5) Helkotropism (to attraction of Gravitation); (6) Haptotropism (to touch); (7) Orthotropism (becoming erect or pendulous); (8) Circumnutation (bowing around).

I avoid the usual term Geotropism, used for the influence of Gravitation, because a "turning earthwards" may be due to shade as well; while Apogeotropism, I would regard as a synonym for *one* application of Orthotropism; for organs can place themselves in a vertical position from more than one cause.

PHOTOTROPISM, HELIOTROPISM AND SKOTOTROPISM, OR THE EFFECTS OF LIGHT AND SHADE.

In flowering plants, as soon as a seed begins to germinate, the root-end (radicle) and shoot-end (plumule) of the embryo first begin to grow in opposite directions, under the influence of external stimuli. The first question is, Why do they grow orthotropically, *i.e.* in a vertically straight line, and why does the former bend downwards and the latter upwards, if the growing seedling be placed horizontally? As gravitation is a constant force acting vertically downwards, we might naturally infer that this was the cause acting on the root, and so the "turning downwards," under the influence of gravitation was called "Geotropism" and the turning upwards of the shoot was named "Apogeotropism." These words are descriptive only, not explanatory.

If we turn to the simplest or unicellular organisms, such as the spherical spores of Cryptogams, which have no polarity or any distinction of parts, we find that the two most important stimuli are light and shade. Thus the first cell-division, as in the spores of *Fucus*, *Equisetum* * and *Ascophyllum*, † is approximately at right angles to the incident light, the daughter-cell facing the less illuminated half develops into the root, while the other becomes the shoot-end. Sachs describes and figures the shoot and gemmule of *Marchantia*, and the structures are reversed when the usual dorsi-ventral arrangement has been made to be ventri-dorsal. ‡ Similar effects are produced on the prothallia of ferns; so that the position of the sexual arrangements are always on the *shaded* side. If the prothallium be grown immersed in water it curves itself so as to be at right angles to the light and then produces those organs on the shady side.

Chlorophyll granules illustrate both phototropism and skototropism very well; for in diffused light they spread themselves over the superficial cell in such simple plants as duckweed; such would be phototropism; but if the direct light of the sun be very intense they place themselves over the vertical walls to avoid it. This movement is therefore skototropism or apheliotropism, whichever term be preferred.

In the case of germinating embryos of plants which do not grow on the ground, as the mistletoe and epiphytes, the roots adhere to the bark of trees and do not grow downwards, but turn towards the darker side. In the mistletoe the hypocotyledonary axis terminates in a pestle-like expansion in adaptation to the bough to which the seed adheres by mucilage. This peculiar organ is prepared by heredity in advance, in readiness for adhesion, just like the pads of *Ampelopsis Veitchii.*

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* See *Origin of Plant Structures*, p. 197, note.

† Res. *Gen. de Bot.*, I., p. 58, fig. 5.

‡ *Sachs' Phys. of Plants*, p. 524–6.

In epiphytes, as orchids and aroids, some roots cling to the stems horizontally, while others descend freely and vertically to the ground ; so that while shade determines the former to grow towards, and haptotropism,[*] to cling to the stem as they elongate, gravitation affects the latter.

The climbing roots of ivy also emerge from the less illuminated side of the stem. This latter, too, is acted upon by shade, for when the stem reaches the top of a wall the terminal shoot bends downwards in order to grow flat upon it. As it is quite immaterial whether the ivy be growing on the north or south side of the wall, the movement can only be due to a preference for less illumination. Of course this is now a hereditary adaptation to the production of climbing roots. Similarly do the shoots of *Ampelopsis* turn to the shady side, as they require their adhesive pads to adhere to the wall.

Ordinary leaves place themselves at right angles to incident light. This might be called diaphototropism.[†] The consequence is that they are dorsi-ventral in structure ; but some have acquired the now hereditary habit of reversing the sides, as *Alstroemeria.* The internal structure is correspondingly reversed. It is produced by a twisting of the short petiole, possibly to acquire strength, just as the ovary of *Orchis*, which has no central placenta, acts as a strengthening pillar.

If a naturally growing blade be partially fixed in a reversed position when growing it makes a most determined effort to right itself.

Now the orthotropic growth of ordinary stems and the axial roots of germinating seedlings, was presumedly and *primarily* (like spores) due to phototropism and skototropism respectively.

This is well seen in growing seeds, as of mustard, suspended in water, and covered above by a screen, but exposed to bright illumination from below only. In this case the hypocotyls all turn downwards.

HEREDITARY INFLUENCES.—Besides the influence of shade, as the root grows downwards gravitation acts upon it and its effects have become fixed and hereditary. Similarly growth in opposition to it, primarily due to phototropism, has become fixed ; so that shoots fresh cut and laid in total darkness will turn up their tips.

That one of the elements of geotropism, *i.e.* "turning earthwards" is skototropism is seen in young roots, say of mustard when grown in water, which offers no resistance. If the glass vessel be surrounded with black paper, one strip only being left uncovered for the entrance of light, all the roots bend to the opposite side. Roots of cabbage grow downwards though illuminated only from below.

Mr. W. G. Smith described, some years ago, how the stolons of *Saxifraga sarmentosa* in a pot by a window grew inwards, but as they produced new rosettes, they turned towards the window, *their* stolons growing inwards till they produced secondary rosettes and so on. He notes that other stolons on the ground, as strawberry runners, have a strong tendency to "congregate in more than usually shaded places."* Now it must be emphasized that many habits of plants due to growth originally caused by responses to external stimuli may become so permanently fixed in the life of the species that they occur when the original stimulus is not present.

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[*] A term proposed by Prof. Leo Errera, for action of tendrils, etc.

[†] Dia-, in the sense of "across."

This permanency of acquired habits is thus well described by Professor Vines. In speaking of the periodicity in the circulation of water in plants, he says: "It has doubtless been induced in plants by the daily variations of external conditions, perhaps more especially of illumination, which are involved in the alternation of day and night; but it has become so much a part of the nature of plants, that it is exhibited, even when the conditions which originally induced it are not present, and it is transmitted from generation to generation."† Darwin corroborates such tendencies to become hereditary.‡

There is reason to think that an acquisition of *any* special habit may become fixed and hereditary. Perhaps one of the most conspicuous is the orthotropism of the terminal part of a stem in total darkness when it has been placed horizontal, already referred to.

It is customary to attribute this orthotropism to gravitation; but we must remember that erect stems grow in *direct opposition* to it; and, to do this, the stem develops varying amounts of mechanical tissues, always somewhat in excess, to resist the ever existing downward "pull" of gravitation, and other strains due to wind, &c.

A remarkable instance of change of direction is seen when the tap-root or the terminal shoot of the stem is removed. In the former case, the secondary previously horizontal roots grow downwards, and the boughs near the top grow upwards. These changes must be partially at least attributable to some sudden impulse due to the checks given to the flow of sap in both cases, coupled with gravitation and light.

A permanent result of the former is seen in all Monocotyledons and aquatic Dicotyledons, as in neither is the tap-root preserved, but numerous adventitious roots arise from the stem and grow downwards, supporting it as well as absorbing nourishment. Analogous instances may be seen in the two varieties of trees called "fastigiate" and "weeping." In the former *all* the branches grow orthotropically, and in the latter in a pendulous manner. How these habits arise is not known. It appears they may (as in Irish yew), or more probably may not, be hereditary, as in the ash. Seedlings sometimes show at first a slight tendency "to weep," but subsequently lose it.

Sachs gives an excellent illustration to show these inherited tendencies to orthotropism. A *Yucca gloriosa* growing in a pot, with its vertical rhizome, is inverted. In this condition buds on the rhizome, as well as roots are developed from it, the former grow vertically upwards and the latter downwards, though both are, of course, in total darkness, as they are buried in the soil. §

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* *Gardeners' Chronicle.*

† *Physiology of Plants*, p. 96.

‡ *Movements of Plants*, pp. 407, 491.

§ Sachs' *Physiology of Plants*, p. 529, fig. 344.

In the preceding few cases, the organs *grow* in accordance with the external stimuli; but if the relative positions of plants with respect to light, gravitation, &c., be altered, then the organ moves or bends out of its original direction to try to put itself in harmony with it.

These external stimuli, therefore, *first*, induce growth, and *then*, when the direction is changed, the plant-organs respond and move themselves so as to be in adaptation with it. Thus, if cabbage or other seed be grown in a pot, upon which the light falls from one side, the seedlings, as they come up, at once *grow* towards it. If the pot be reversed in position, the hypocotyls begin to bend, about one-third of their length from the cotyledons, the curvature extending downwards till the middle of the concave side is about half-way. There is no circumnutation, but a bending solely in a vertical plane. This phototropism may be repeated again and again if the pot be repeatedly turned half-round.

How are we to account for the fixed and hereditary habit of ivy and *Ampelopsis* turning their shoots in the direction of the less illuminated side?

Comparing the climbing position of the stem with the upper free-growing flowering branches of ivy, the latter have just the reverse habit, for they grow outwards, away from the trunk and branches of the tree to which the lower part of the stem clings. Similarly in the Virginia creeper, the tendrils were originally adapted to grasping twigs and climbing by that means, as do vines, to which the *Ampelopsis* is closely allied.

There seems to be but one answer, viz., it is an acquired and now hereditary habit. A species of *Trichosanthes* of the cucumber family, cultivated in a frame, accidentally found its tendrils pressing against the brick wall. Contrary to its normal habit, it at once began to make adhesive pads; and so we may imagine that the ancestor of the Virginia creeper first acquired this habit in a similar way, the tendrils being now fixed to the wall by adhesive pads; so that its illumination is one-sided. This unequal illumination we must assume caused a response to arise which now induces the shoots to grow or turn towards the darker side.

Of course, the origin of all epiphytal plants which cling to the boughs or trunks of trees by means of aërial roots will receive the same interpretation. Thus a tropical epiphytal orchid begins by the seeds being blown up to and resting on the boughs. It could not long remain there *unless its roots could cling to the bough.* We must assume, therefore, that they turned towards the bough, as the radicle of the mistletoe does, that is the less illuminated side, and adhered by clasping and cementing epidermal cells.

HYDROTROPISM and HELKOTROPISM.*

Both moisture and gravitation play a great part in determining the direction of root growth. The latter is a feeble force and easily counteracted by the former, as Sachs has so well shown †; but when roots are permeating a uniformly moist soil, as they arise endogenously at right parallel to the parent root, they simply continue to elongate more or less in the same direction. If, however, they be in a comparatively drier place and a moister one be at some distance, they will *grow* in the direction of the latter quite irrespective of gravitation. So that Hydrotropism easily overcomes Helkotropism.

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* I suggest this word, as Geotropism may be partly due to darkness and moisture besides gravitation. The Greek verb *helko*, to "attract," is used of the magnet, as well as of the "drawing" down of a balance by weight, *i.e.*, gravitation.

† *Phys.*, p. 715, fig. 404.

A good illustration of what may be most probably due to gravitation *alone* is seen in the descending aërial roots of the Indian fig or banyan; inasmuch as the dense shade would be *above* and light *below*; so that as the roots pass through the air this would be throughout equally dry or moist as the case may be, leaving gravitation alone to exert its influence.

THERMOTROPISM.

Another stimulus of attraction causing movements, is heat. When one side of a plant receives a higher degree of temperature than the other, stems and leaves will often turn to the warmer side. Kerner observes that in the high Alps, the air being rarefied, the exposed ground receives great heat from the sun; but the temperature of the air above it may be lower; so that many plants creep along the ground, such as species of willow, "*Juniperus pyramidata* var. *humilis*, called the 'creeping Sabina.' *J. nana* or *alpina*, *i.e.* a dwarf form of *J. communis*, sends out from the collar of the root long branches trailing on the ground, as is generally the case with Alpine plants." *

Kerner gives the excess of the mean temperature of the soil over that of the air of different altitudes on the Central Tyrolese Alps as follows: at 1,000 m., 1·5°C.; at 1,300 m., 1·7°C.; at 1,600 m., 2·4°C.; at 1,900 m., 3·0°C.; and at 2,200 m., 3·6°C.

In warmer climates similar phenomena are to be seen. I frequently noticed in Malta that very many plants are prostrate when growing by road sides, where the limestone rock is often exposed and gets heated. The Maltese 'clover,' *Hedysarum coronaria*, grows to a height of 3 feet in the fields, but stray plants are perfectly prostrate by the roads. The same thing occurs with both *Malva sylvestris* and *M. parviflora*.

Similarly with leaves, a small species of dandelion often grows between the loose stones of walls in Malta. When extracted, the leaves, which were flat against the hot vertical wall, curled back against the root and refused to be straightened out when required to be dried.

In early spring in England, bluebells may be seen having their first formed leaves lying flat on the ground, and daisies and plantains always have them so in a close-cut lawn.

The following observations on temperatures will perhaps show how thermotropism may account for the prostrate position independently or conjointly with light, a feature of common occurrence in this country.

The temperature at the surface of the damp soil by the side of a bluebell growing in the shade of trees, at 9.45 A.M., April 15, 1891, a sunless morning, was 47° F. The temperature of the air three inches above the ground at the same time and place was 44·5°. At 4 P.M. of the same day, on the surface of the soil the temperature was 60°; while that of the air was 52°. Similiar differences, only varying slightly, occurred on a mown lawn.

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* See *Origin of Plant Structures*, pp. 101, 102.

These observations appear to suggest the cause of the long creeping stems in sand by the sea as of *Carex arenaria*, *Agropyrum* (*Triticum*) *junceum*, &c., in that the hot, upper layer of the sand may be the stimulus to develop shoots which then grow horizontally below the surface; this suggestion is supported by the fact (recorded by Babington) that *Hordeum murinum* var. *arenaria*, Bab., has "the lower part of the stem buried, lengthened and rooting, thus appearing to creep in the sand of the sea-shore."

Experiments have shown that the shoots of cress seedlings curved away from the source of heat whereas maize seedlings curved towards it. The roots of hyacinths are thermotropic, but the leaves apothermotropic (Vines). I found seedlings of wild cabbage were indifferent to heat, when the pot containing them was in total darkness, the temperature by the side next a fire being 100° F., and the opposite side, 80°. The pot was 3 inches in diameter.

HAPTOTROPISM AND APHAPTOTROPISM.

So many cases of organs bending after being touched are described by Darwin in his works on *The Movements of Plants* and *Insectivorous Plants*, &c., that the reader is referred to them. With regard to root-tips, "Sachs discovered that the radicle a little above the apex is sensitive and bends like a tendril *towards* the touching object. But, when one side of the apex is pressed by any object, the growing part bends *away* from the object. . . . We are therefore led to suspect that the *apex* was sensitive to contact . . . Some few stems bend towards a touching object, but no case, we believe, is known of an organ bending away from one." [*] The advantage of this power to a root penetrating the soil is obvious.

ORTHOTROPISM.

Besides phototropism, another kind of orthotropic motion is produced by growth in the development of leaf-buds. If the opening bud of lime or beech be observed in spring, the young leaves, as they appear, curve downwards, and as they gradually enlarge and become full-grown, rise up again and assume the horizontal position. In the walnut the petiole of the pinnate leaf curves strongly downwards, and only rises when the leaflets are fully developed. In the ash the petiole curls upwards. In every case they are in a vertical line, hence I call it orthotropism.[†]

The "object" of these movements is to place the delicate immature blades in an erect or vertical position so as to avoid the chill produced by radiation, which is always greater from a horizontal surface. Leaves perform very similar movements in the tropics, but in this case it is to protect them from desiccation under the powerful heat of the sun. The movement, therefore, is apheliotropism.

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[*] *Movements of Plants*, pp. 131, 132.

[†] "Vernation and the Methods of Development of Foliage, as Protective against Radiation."—*Jour. Lin. Soc.*, vol. xxi. p. 624.

In intensely cold winters the leaves of evergreens, such as holly, may be seen to hang vertically downwards as long as the cold lasts.

An analogous orthotropism is seen in the sleep or hypnotic condition of plants fully described by Darwin, in his *Movements of Plants.*

CIRCUMNUTATION.

As soon as the root and stem have grown long enough, having been vertical at first, they both begin to move approximately in circles or ellipses. This is presumably due to the apical growth of the stem not being strictly simultaneous at all points of the circumference. If the tip of the stem of some cryptogams—say, *Equisetum*[*]—which is simpler than that of an Angiosperm, be examined, it will be found to possess a conspicuous terminal cell. From this, new cells are cut off in a spiral order, the centre of each cell being at 120° from the preceding, as measured on radii from the centre of the apical cell.

Though it has not been clearly demonstrated that the apices of Angiospermous stems *start* with a single cell, as this apex is so soon composed of a mass of merismatic tissue, still, judging by the "bowing around," or "circumnutation" as it is called, in a continuously spiral manner (allowing for irregularities), one is inclined to assume that a batch of cells at one point precedes in its formation that of another, about 120° from the former, just as is the case with single cells in the apex of the stem of *Equisetum* or horse-tail.

Darwin has given us many diagrams of traces, both of roots and stems, circumnutating, so the reader can consult them in his work on *The Movements of Plants.*

Circumnutation of a stem, therefore, may be assumed to result from the process of growth in a definite manner. Perhaps the most conspicuous case is seen in the movements of climbing or twining stems. Darwin attributed this to the elongated shoot bending or nodding around, in search, as it were, of a support. As soon as the stem touches another all motion is arrested below the point of contact, while the upper part continues to nutate, and so it winds itself round the support. Sachs calls attention to an omission, that the apex in consequence of the continued elongation of the stem, really moves in a spiral or corkscrew-like manner. This may perhaps facilitate the twining process.[†]

Tendrils also circumnutate until the tip has coiled round some object (by haptotropism) ; having acquired a sensitiveness to touch, the previously straight tendril then coils itself into spirals, as many times in one direction as in the opposite. This is effected by means of crank-like straight lengths rotating. I have described this in detail elsewhere.[‡]

The circumnutation of more or less completely formed organs, such as leaves and tendrils, seems to require some other interpretation than apical growth ; and at present there does not appear to be any satisfactory explanation of this phenomenon.

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[*] See Fig. 111 in Sach's *Text Book of Botany*, p. 143.

[†] Darwin, however, appears to recognize this fact, for he says : "The belief that twiners have a natural tendency to grow spirally, probably arose from their assuming a spiral form when wound round a support, and from the extremity, even whilst remaining free, sometimes assuming this form."-- *Climbing Plants*, p. 17.

[‡] *Jour. R. Hort. Soc.*, vol. xxxiv. p. 417.

Of course there are many more cases of special character, but the reader is referred to Darwin's two books, *Climbing Plants* and the *Movements of Plants*, which supply an abundance of information.

In conclusion, I would summarize what appear to be important procedures in Nature.

1. The external stimulus is the *cause* (by means of the responsive power of the organism) of a definite or special *structure* in adaptation to it; *e.g.* light and shade causing polarity.

2. If the *direction* of the stimulus be changed, the organ may *move* so as to put itself in adjustment with it; *e.g.* Phototropism, Hydrotropism, &c.

3. The *tendency* only, to produce the structure may be hereditary; *e.g.* in the formation of adhesive pads in *Ampelopsis hederacea.*

4. The structure itself may be hereditary and be more or less completely formed *before* the influence can act; *e.g.* in the formation of adhesive pads in *A. Veitchii.* Such is the inheritance of acquired characters.

5. The *direction* of the growth of the organ can be hereditary apart from the presence of the original stimulus which caused it; *e.g.* the erection of shoots laid horizontally (originally due to light) in total darkness.

THE INTRODUCTION OF THE TULIP, AND THE TULIPOMANIA.

By Mr. W. S. Murray, F.R.H.S.

[Read March 9, 1909.]

During the preparation of this paper on the introduction of the Garden Tulip into Europe and the subsequent craze or gamble in the seventeenth century, I have had the privilege of consulting the magnificent library belonging to Mr. Krelage, and at the outset I take the opportunity of thanking him for his kindness and courtesy in allowing me free access to it.

The first mention of the introduction of the Garden Tulip into England is made by Richard Hakluyt, who, in 1582, in his "Remembrances of Things to be Endeavoured at Constantinople," says: "And now within these four years there have been brought into England from Vienna in Austria divers kinds of flowers called Tulipas, and these and others procured thither a little before from Constantinople by an excellent man called M. Carolus Clusius."

Hakluyt was, however, wrong in attributing the honour of introducing the Tulip from the Levant to Clusius.

When Augerius Ghislenius Busbequius, the Ambassador of the Emperor Ferdinand I. to the Sultan, was travelling to Constantinople in the year 1554, he saw this flower for the first time in a garden between Adrianople and Constantinople. The most remarkable passage in his letters on his journey reads as follows: "As we passed, we saw everywhere abundance of flowers, such as the Narcissus, Hyacinths, and those called by the Turks Tulipan, not without great astonishment on account of the time of the year, as it was then the middle of winter, a season unfriendly to flowers. Greece abounds with Narcissus and Hyacinths, which have a remarkably fragrant smell; it is indeed so strong as to hurt those that are not accustomed to it. The Tulipan, however, have little or no smell, but are admired for their beauty and variety of colour. The Turks pay great attention to the cultivation of flowers, nor do they hesitate, though by no means extravagant, to expend several aspers for one that is beautiful. I received several presents of these flowers, which cost me not a little."* The assertion that the Turks call the flower Tulipan is founded upon a misunderstanding, as the only Turkish name for Tulip is "Lale." The interpreter to Busbequius may have described the flower as being similar to the Turkish headgear, the fez, which is the shape of a cup. "Dubbend" is a Persian word for Nettle-Cloth, such as the Turks use as a fez, and from which Europeans derive the word turban.

Some few years later, in 1559, Conrad Gesner saw the first Garden Tulips that were grown outside Turkey growing in a garden at Ausburg, and described them in 1561.[*] He says: "In this year of our Lord 1559, at the beginning of April, in the garden of the ingenious and learned Councillor John Henry Herwart, I saw there a plant which had sprung from seed which had been procured from Byzantia, or as some say from Cappadocia. It was growing with one large reddish flower, like a red lily, having eight petals of which four are outside, and just as many within, with a pleasant smell, soothing and delicate, which soon leaves it." Levier points out that, according to the description, the smell, and its early blooming, it is known as a spring Tulip, which to-day is described as *Tulipa suaveolens*, and not as *Tulipa Gesneriana*, and it may be assumed that these Tulips grown at Ausburg were grown from seed brought home, or sent home, by Busbequius.

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* *Busbequii Ep. Basiliae,* 1740, p. 36.

Clusius in his works does not refer to the Ausburg Tulips, for in comparing the different dates the earliest is 1593, when Clusius came to Vienna, and there met Busbequius, from whom he obtained Tulip seeds, as he mentioned in his "History of Rare Plants,"[†] and as he makes no earlier reference we may take it that these seeds yielded the first Tulips that Clusius owned. Later, Clusius tells us he made experiments as to the comestibility of the bulbs, and in the year 1592 he instructed the apothecary, J. Muler, of Frankfort, to preserve some in sugar, as was done with the bulbs of the Orchids, and he found them far superior in taste and sweetness to the latter. In 1593 Clusius was appointed Professor of Botany at Leiden, but the Tulip found its way into Holland before Clusius and probably quite independently of him. In the "Historisch Verhaal," of April 1625, Vol. ix. 9th vers', Nicolas Wassenaer writes: "The first Tulip seen in Amsterdam was in the garden of the apothecary Walich Zieuwertz, to the great astonishment of all the florists; but they increased considerably after the celebrated botanist Dr. Clusius came to Leiden, who, besides Tulips, brought with him many other rare plants, such as the Hyacinth of Peru, which was sold for 40 florins, also the first Crown Imperial; and that Dr. Clusius now charged such an extortionate price for his Tulips, so much indeed that no one could procure them not even for money. Plans were made by which the best and most of his plants were stolen by night, whereupon he lost courage and the desire to continue their cultivation; but those who had stolen the Tulips wasted no time in increasing them by sowing the seeds, and by this means the seventeen provinces were well stocked."

As early as 1590 Joh. Hogeland grew the Tulip in Leiden,[‡] and he possibly procured them from one George Rye, a merchant of Mechlin, who made a study of plants and who cultivated Tulips that he had received from an Eastern merchant at Antwerp.[§]

Clusius divided his Tulips into three classes in accordance with their time of flowering—*Praecoces*, the early flowering, *Serotinae*, the late, and *Dubiae*, those flowering between the two. He does not lose sight of the fact that such a division could not be of importance, inasmuch as he says explicitly (l.c. p. 147) that he has grown from the same seed Tulip Praecox and some single plants of the other two species. Parkinson, however, was stricter in his mode of division, and says in his "Paradisus,"

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[*] *De Hortis Germaniae, &c.*, p. 213.

[†] p. 142.

[‡] Clusius, l.c. 147.

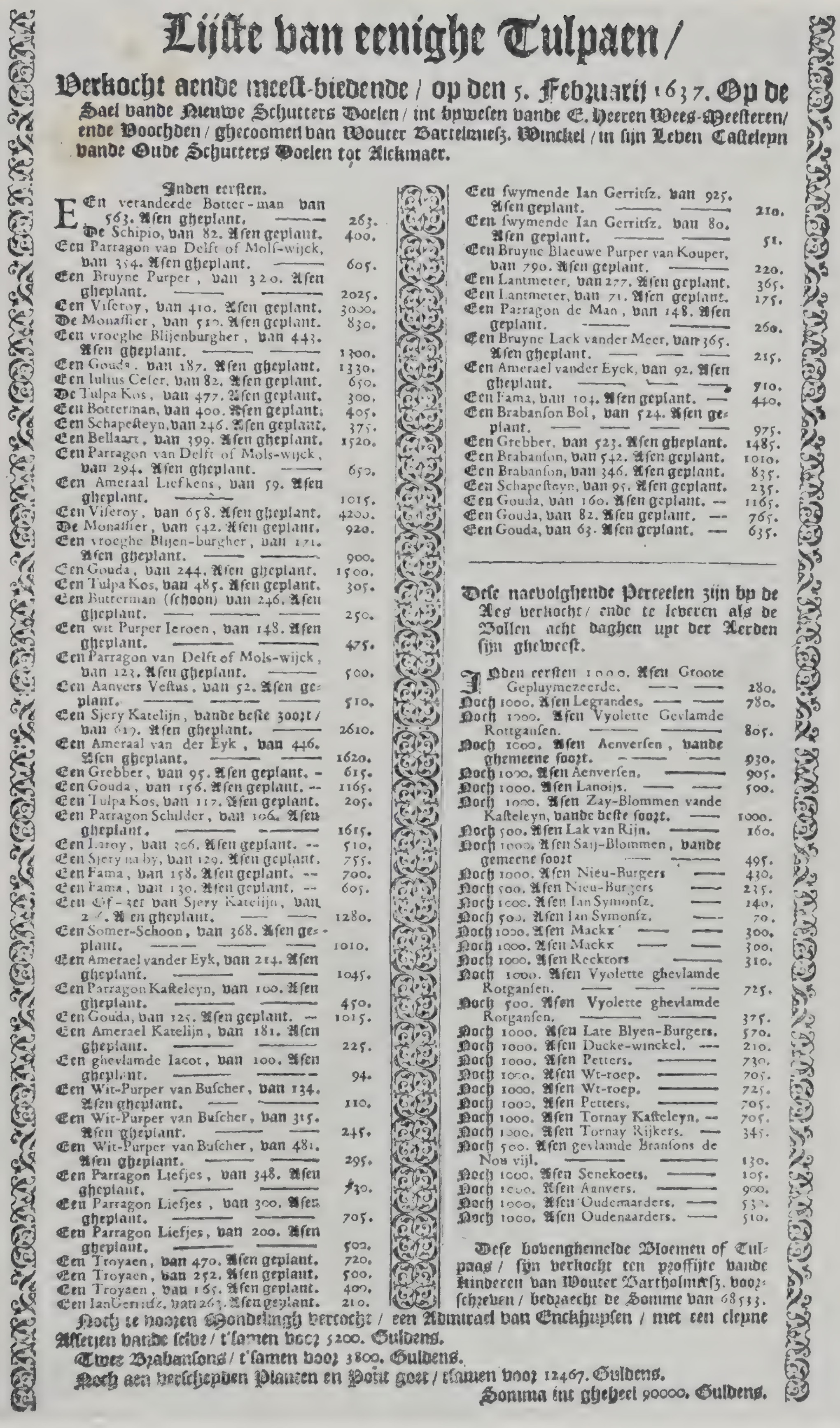
[§] Clusius, l.c. 150.

1629), "The chief division of Tulipas is into two sorts—*Praecoces*, early flowering Tulipas, and *Serotinae*, late flowering Tulipas. For that sort which is called *Mediae* or *Dubiae* do near participate with the *Serotinae*"; further, he denies the possibility of producing a *Praecox* flower from the seed of a *Media* Tulip, although, as he says, "I know Clusius, an industrious, learned and painful searcher and publisher of these rarities, saith otherwise." Miller in his "Gardener's Dictionary," 1733, says, "Tulips are usually divided into three classes, but there is no occasion for making any more distinctions than two, viz. early and late blowers," and he enumerates five rules of beauty for the Florist's Tulip, according, as he says, "to the characteristics of the best florists of the age."

1. It shall have a tall strong stem.
2. The flower shall consist of six leaves, three within and three without; the former ought to be larger than the latter.
3. Their bottom should be proportioned to their top, and their upper part should be rounded off, and not terminate in a point.
4. Their leaves should neither turn inward nor bend outward, but rather stand erect, and the flower should be of a middling size, neither over large nor too small.
5. The stripes should be small and regular, arising quite from the bottom of the flower, for if there are any remains of the former self-coloured bottom, the flower is in danger of losing its stripes again. The chives (stamens) should not be yellow, but a brown colour. When a flower has all these properties it is esteemed a good one.

Laubach tells us of two Turkish manuscripts procured by Von Diez, and now in the Archives of Berlin. The first of the two books, entitled "The Habit of Flowers," was written by the Sheik Mohammed Lalezari, who flourished in the reign of Sultan Achmed III., 1703–1730, and wrote also for the Grand Vizier Ibrahim Pasha, 1718–1730. This appears from the first page of the book, which says: "This is the booklet which was made by order of the late Ibrahim Pasha." Lalezari, a name which probably means Tupilanist, tells us that he stood in great esteem by the Sultan, who gave him the pet name of Schukjuf Perweran (Connoisseur of Flowers), and in his treatise deals exhaustively in two chapters with the Tulip. The first of these deals with twenty species and explains their points of beauty, whilst the second chapter contains directions concerning the cultivation of the Tulip bulb and seeds. Reference is made to numbers of Tulips and Narcissi with such names as 'Mihir Sulemani' (Beloved Sulemans), 'Ferah Efza' (Gladness increasing), and so on.

The second manuscript bears the title "Acceptable and Beautiful." It presents a systematically arranged catalogue of various sorts of one flower, but is not explicit as to the name of that flower, the origin of the seed, and the description of the bloom. Von Diez gives a translation as follows: "As the colour of the violet, curved as the form of the new Moon, her colour is well apportioned, clean, well proportioned, almond shape, needle like, ornamented with pleasant rays, her inner leaves as a



Lijſte van eenighe Tulpaen /

Verkocht aende meeſt-biedende / op den 5. Februarij 1637. Op de Sael vande Nieuwe Schutters Doelen / int bywesen vande E. Heeren Wees-Meeſteren / ende Voochden / ghecoomen van Wouter Bartelmieſz. Winckel / in ſijn Leven Caſteleyn vande Oude Schutters Doelen tot Alckmaer.

Inden eerſten.

EEn veranderde Botter-man van 563. Aſen gheplant.	263.
De Schipio, van 82. Aſen geplant.	400.
Een Parragon van Delft of Molſ-wijck, van 354. Aſen gheplant.	605.
Een Bruyne Purper, van 320. Aſen gheplant.	2025.
Een Viſeroy, van 410. Aſen geplant.	3000.
De Monaſſier, van 510. Aſen geplant.	830.
Een vroeghe Blijenburgher, van 443. Aſen gheplant.	1300.
Een Gouda. van 187. Aſen gheplant.	1330.
Een Iulius Celer, van 82. Aſen geplant.	650.
De Tulpa Kos, van 477. Aſen geplant.	300.
Een Botterman, van 400. Aſen geplant.	405.
Een Schapeſteyn, van 246. Aſen geplant.	375.
Een Bellaart, van 399. Aſen gheplant.	1520.
Een Parragon van Delft of Mols-wijck, van 294. Aſen gheplant.	650.
Een Ameraal Liefkens, van 59. Aſen gheplant.	1015.
Een Viſeroy, van 658. Aſen gheplant.	4200.
De Monaſſier, van 542. Aſen geplant.	920.
Een vroeghe Blijen-burgher, van 171. Aſen gheplant.	900.
Een Gouda, van 244. Aſen gheplant.	1500.
Een Tulpa Kos, van 485. Aſen geplant.	305.
Een Butterman (ſchoon) van 246. Aſen gheplant.	250.
Een wit Purper Ieroen, van 148. Aſen gheplant.	475.
Een Parragon van Delft of Mols-wijck, van 123. Aſen gheplant.	500.
Een Aanvers Veſtus, van 52. Aſen geplant.	510.
Een Sjery Katelijn, vande beſte ſoort / van 619. Aſen gheplant.	2610.
Een Ameraal van der Eyk, van 446. Aſen gheplant.	1620.
Een Grebber, van 95. Aſen geplant.	615.
Een Gouda, van 156. Aſen geplant.	1165.
Een Tulpa Kos, van 117. Aſen geplant.	205.
Een Parragon Schilder, van 106. Aſen gheplant.	1615.
Een Laroy, van 306. Aſen geplant.	510.
Een Sjery na by, van 129. Aſen geplant.	755.
Een Fama, van 158. Aſen geplant.	700.
Een Fama, van 130. Aſen geplant.	605.
Een Cif-zet van Sjery Katelijn, van 2[illegible]. Aſen gheplant.	1280.
Een Somer-Schoon, van 368. Aſen geplant.	1010.
Een Amerael vander Eyk, van 214. Aſen gheplant.	1045.
Een Parragon Kaſteleyn, van 100. Aſen gheplant.	450.
Een Gouda, van 125. Aſen geplant.	1015.
Een Amerael Katelijn, van 181. Aſen gheplant.	225.
Een ghevlamde Iacot, van 100. Aſen gheplant.	94.
Een Wit-Purper van Buſcher, van 134. Aſen gheplant.	110.
Een Wit-Purper van Buſcher, van 315. Aſen gheplant.	245.
Een Wit-Purper van Buſcher, van 481. Aſen gheplant.	295.
Een Parragon Liefjes, van 348. Aſen gheplant.	[illegible]30.
Een Parragon Liefjes, van 300. Aſen gheplant.	705.
Een Parragon Liefjes, van 200. Aſen gheplant.	500.
Een Troyaen, van 470. Aſen geplant.	720.
Een Troyaen, van 252. Aſen geplant.	500.
Een Troyaen, van 165. Aſen geplant.	400.
Een IanGeritſz, van 263. Aſen geplant.	210.
Een ſwymende Ian Gerritſz. van 925. Aſen geplant.	210.
Een ſwymende Ian Gerritſz. van 80. Aſen geplant.	51.
Een Bruyne Blaeuwe Purper van Kouper, van 790. Aſen geplant.	220.
Een Lantmeter, van 277. Aſen geplant.	365.
Een Lantmeter, van 71. Aſen geplant.	175.
Een Parragon de Man, van 148. Aſen geplant.	260.
Een Bruyne Lack vander Meer, van 365. Aſen gheplant.	215.
Een Amerael vander Eyck, van 92. Aſen gheplant.	710.
Een Fama, van 104. Aſen geplant.	440.
Een Brabanſon Bol, van 524. Aſen geplant.	975.
Een Grebber, van 523. Aſen gheplant.	1485.
Een Brabanſon, van 542. Aſen geplant.	1010.
Een Brabanſon, van 346. Aſen geplant.	835.
Een Schapeſteyn, van 95. Aſen geplant.	235.
Een Gouda, van 160. Aſen geplant.	1165.
Een Gouda, van 82. Aſen geplant.	765.
Een Gouda, van 63. Aſen geplant.	635.

Deſe naevolghende Perceelen zijn by de Aes verkocht / ende te leveren als de Bollen acht daghen upt der Aerden ſijn gheweeſt.

IOden eerſten 1000. Aſen Groote Gepluymezeerde.	280.
Noch 1000. Aſen Legrandes.	780.
Noch 1000. Aſen Vyolette Gevlamde Rottganſen.	805.
Noch 1000. Aſen Aenverſen, vande ghemeene ſoort.	930.
Noch 1000. Aſen Aenverſen.	905.
Noch 1000. Aſen Lanoijs.	500.
Noch 1000. Aſen Zay-Blommen vande Kaſteleyn, vande beſte ſoort.	1000.
Noch 500. Aſen Lak van Rijn.	160.
Noch 1000. Aſen Saij-Blommen, vande gemeene ſoort	495.
Noch 1000. Aſen Nieu-Burgers	430.
Noch 500. Aſen Nieu-Burgers	235.
Noch 1000. Aſen Ian Symonſz.	140.
Noch 500. Aſen Ian Symonſz.	70.
Noch 1000. Aſen Mackx	300.
Noch 1000. Aſen Mackx	300.
Noch 1000. Aſen Recktors	310.
Noch 1000. Aſen Vyolette ghevlamde Rotganſen.	725.
Noch 500. Aſen Vyolette ghevlamde Rotganſen.	375.
Noch 1000. Aſen Late Blyen-Burgers.	570.
Noch 1000. Aſen Ducke-winckel.	210.
Noch 1000. Aſen Petters.	730.
Noch 1000. Aſen Wt-roep.	705.
Noch 1000. Aſen Wt-roep.	725.
Noch 1000. Aſen Petters.	705.
Noch 1000. Aſen Tornay Kaſteleyn.	705.
Noch 1000. Aſen Tornay Rijkers.	345.
Noch 500. Aſen gevlamde Branſons de Nou vijl.	130.
Noch 1000. Aſen Senekoets.	105.
Noch 1000. Aſen Aanvers.	900.
Noch 1000. Aſen Oudenaarders.	530.
Noch 1000. Aſen Oudenaarders.	510.

Deſe bovenghemelde Bloemen of Tulpaas / ſijn verkocht ten proffijte vande Kinderen van Wouter Bartholmeſz. voorſchreven / bedraecht de Somme van 68533.

Noch te voren Mondelingh vercocht / een Admirael van Enckhuyſen / met een cleyne Aſſetjen vande ſelve / t'ſamen voor 5200. Guldens.

Twee Brabanſons / t'ſamen voor 3800. Guldens.

Noch aen verſcheyden Planten en Potit goet / t'ſamen voor 12467. Guldens.

Somma int gheheel 90000. Guldens.

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FIG. 1.

Record of a Tulip sale by auction held at the "Nieuw Schutters Doelen," Alkmaar, February 5, 1637, by order of the Governors of the Orphanage, under whose care were the children of Wouter Bartelmiesz, innkeeper of the "Oude Schutters Dollen," Alkmaar. The sale being held while the bulbs were still in the ground, the weight of each bulb when planted was given. These few bulbs realized 0,000 florins, or £7,500.

[*To face p. 20.*

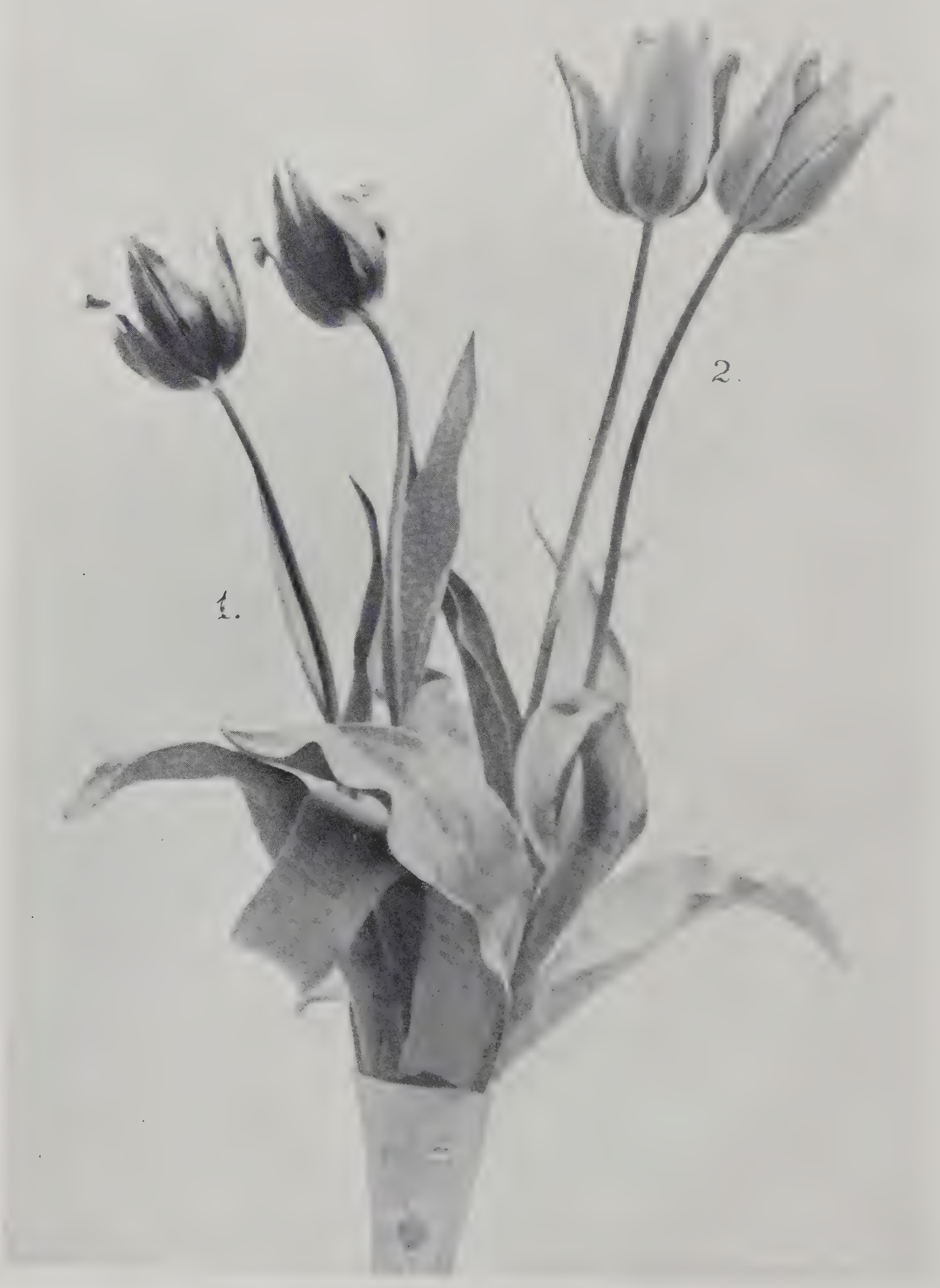

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FIG. 2.—TULIPA DIEF (THE THIEF TULIP)

No. 1, Scarlet with yellow border; No. 2, Claret-wine colour.

[To face p. 21

well, as they should be, her outer leaves a little open, as they should be; the white ornamented leaves are absolutely perfect, she is the chosen of the chosen." Now although nothing is said as to which flower is described, Von Diez, quite rightly, thinks that only Tulips can be meant. The flower described would be termed nowadays a 'Bybloemen,' and, as the author enumerates no fewer than 1,323 varieties, although the full description is given of 74 only, one can form an estimate of the many varieties of the Tulip under cultivation in those days. Von Diez further draws attention to the twenty rules of beauty detailed by Lalezari, which corresponded with those of Europe with one exception. The perfect Turkish Tulip, according to Lalezari, had pointed petals on the 4 to 6 scale; the Western taste of that time, however, demanded a possible rounded form of petal. It seems that the Tulips originally exported from the Turks all had pointed petals. All the varieties illustrated by Clusius are of this form, and of the illustrations in the works of Parkinson, Langlois and Passeus, but very few are to be found with rounded petals, in striking contrast to the demand made by fashion in the second half of the seventeenth century. Von Diez deduces that these Turkish rules were adhered to at the time of the importation of Tulips into Europe, and have been accepted by Europeans. But his contention is not supported by the writings in the eighteenth century manuscripts of Lalezari, and inasmuch as the Tulip was cultivated in Europe at the end of the seventeenth century, it is possible that a retrospective action towards the Turks was effected; in other words, that the Turks copied from the Europeans the ways and means of identifying the points of beauty, and the classification of the plants, but it is extremely unlikely that a Turk should have copied anything from a disbeliever, and moreover Lalezari refers to former connoisseurs of flowers who prohibited the watering of Tulips until the growth was well above the ground, and describing the Narcissus he says some of the old teachers had laid it down that it was necessary to lift the yellow Narcissus every third year. This confirms that he had researched in older Turkish writings of which we do not know, and that he draws his conclusions from old Turkish grounds, and from these he obtained the names, and recognized points of beauty.

It is possible that the nomenclature and rules of beauty developed in an analogous way. Certainly before the importation of the Turkish flowers into Europe they were unknown, and at the time of Busbequius the Tulip was held in high esteem by the Turks. These rules of beauty apply only to the florist's or Amateur's Tulips known as 'Breeders' (self colours), 'Bizarres' (those with a yellow ground lined or marked with purple and scarlet of different shades), 'Bybloemens' (having a white ground lined or marked with violet or purple of different shades), and 'Roses' (those marked or striped with rose, scarlet, crimson, or cherry colour on a white ground), and they have been dealt with in two excellent papers which have been published in the Journal of our Society, one by Rev. F. D. Horner,* and one by Mr. A. D. Hall. †

Seeds sown from either of these four classes of Tulips produce invariably self colours, which after an indefinite period "break" or change into the colours of one of the three groups, Bizarre, Bybloemen, or Rose. This character of the Tulip has no floral parallel, and at present no scientific explanation has been offered. Tulips are now seldom grown from seeds, as the process although interesting is tedious, taking usually ten years before definite results are obtained, and we are continually getting new and good varieties from the bulbs themselves, which produce spontaneously blooms of more or less the same character but entirely different, either rectified or self-coloured. Two well known varieties from the early flowering class, single 'La Reine' and double 'Murillo' illustrate this. From 'La Reine' we have a yellow, 'Herman Schlegel' or 'Primrose Queen'; a pink, 'Rose La Reine'; a deep rose, 'Reine des Reines'; a white, 'White Hawk'; and further from 'White Hawk,' 'Red Hawk'; 'Flamingo,' pink; 'Ibis,' deep rose; and 'Callipso,' cream. From 'Murillo,' which is itself a pale pink, has arisen a yellow 'Tea Rose' or 'Primrose Beauty'; 'Harlequin,' striped; a pure white, 'Purity' or 'Schoonoord'; 'Paeony White'; 'Meister van der Hoef,' pure yellow; and a dark rose and a mauve, which are as yet unnamed. On our farm last season was noticed in a bed of 'Tournesol' a pure yellow of that variety.

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* Vol. xv., 1893.

† Vol. xxvii., 1902.

One of the most remarkable variations arising in the Tulip is a form of atavism which occurs in all kinds of garden Tulips, but especially in Parrot Tulips. Occasionally a specimen will lose its character and revert to a form of Tulip with narrow flowers; these have no commercial value and are at once destroyed, but from a scientific point of view they are of the greatest interest. This Tulip is known in Holland as 'Tulipa dief,' or Thief Tulip (fig. 2), probably because it replaces one of some value; the two forms are a deep rose, and a red with yellow border. These have been planted and are found to be constant. The conspicuous characteristic lies in their pointed petals. The first leaf of the largest offset develops in a curved form, that is, the tip of the leaf is elongated into a runner which drives horizontally into the soil and to which is attached an offset. The character of the bulb itself is entirely changed to that of an angular form, similar to the bulb of an unbloomed Parrot Tulip, but lighter in colour. I think this similarity between the bulb of the Parrot Tulip and that of the 'Tulipa dief,' rather than the Parrot Tulip being subject to atavism, explains their frequent appearance among the Parrot Tulips. Parrot Tulips have either a red or a yellow ground, the latter therefore belonging to the 'Bizarre' group. That Parrot Tulips are a sport from the late Amateur Tulips has been proved recently at Haarlem, where a fine late Tulip produced unexpectedly a Parrot Tulip of the same colour.*

The late Amateur Tulips more especially 'Roses' and 'Bybloemen' were among those most sought for and purchased for such large sums at the height of the Tulipomania. The many anecdotes relating to this remarkable mania are well known, and have been copied and possibly enlarged upon by one writer from another, and need not be mentioned here. How or when the mania commenced we do not know, for to find the time with certainty it is necessary to discern where fair trading ends and speculation commences. Munting, in his "Beschrijven der Kruyden," places the dates as 1634 1637, but M. Van Damme has written to me stating that he has recently discovered in the Archives of Haarlem papers relating to disputes over Tulips as early as 1611, but as I have not yet seen them I cannot say what bearing they have upon this point. Munting says that the mania originated in France, where the nobility, especially in Paris, gave hundreds and sometimes thousands of florins for a single Tulip bloom; the more beautiful the colour, the higher the price paid. But we have already seen that Tulips were greatly prized when Clusius was at Leiden, for those he grew were coveted and stolen. It would seem more probable that the demand increased with the number of amateur collectors, who would pay high prices for a fashionable or rare specimen, just as to-day large amounts are paid for certain postage stamps; but the period of the actual gamble in the bulbs, which was entered into by weavers, carpenters, carmen, and even servant girls, may not have commenced till 1634.

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* *Florilegium Harlemense*, Tab. 53.

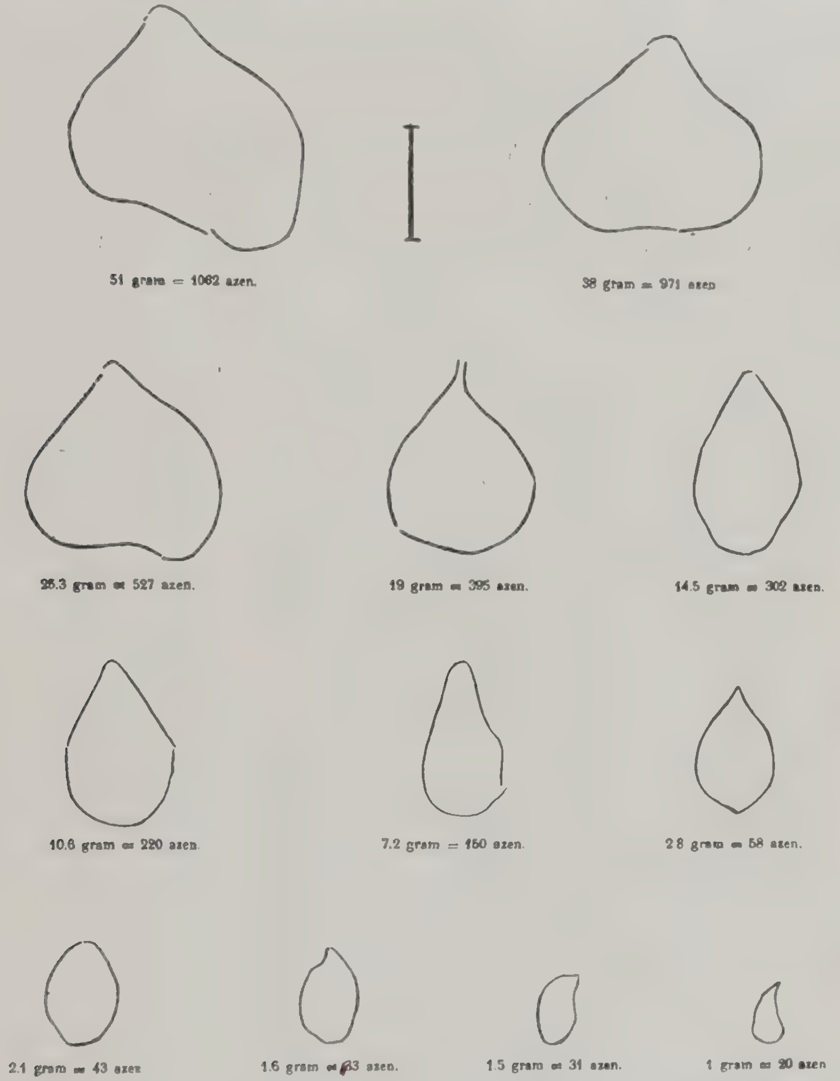

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FIG. 3.—DIAGRAMS SHOWING RELATIVE SIZES OF BULBS WEIGHING 20 AZEN TO 1062 AZEN.

(The vertical line in the middle of the top row represents 1 inch.)

Wassenaer (1623–1625) commented upon the principal varieties of the year; the 'Semper Augustus' is described as the most valuable and beautiful. In 1623 he wrote: "The 'Semper Augustus' has been the most prominent variety of the year; the colour is white and red, tinted blue underneath. No Tulip has been held in higher esteem, and one has been sold for thousands of florins, and yet the seller was himself sold (so he said), for when the bulb was lifted he noticed two lumps on it which the year following would become two offsets, and so he was cheated of two thousand florins." He says further: "The offsets that the bulbs give are the interest, while the capital remains intact." He also considered that bulbs were a safe investment, for one might carry one's capital about in the pocket, and if molested by footpads would not have it stolen as with gold or diamonds.

One bulb which cost sixty florins has in a short time paid 20 per cent. by offsets, reckoning them at only 6*d*. each. Wassenaer tells us that in 1624 the 'Augustus' still kept its former reputation, and that there were only twelve in existence. Averaging large and small they could be bought at 1200 florins each. In 1625, 3000 florins were offered for two of these bulbs, but the owner could not be induced to part with them, for, considering that he was the only one possessing the rare bulbs, no one else could procure them, he put his own value, which was very high, on them.

It was not to be wondered at that such an easy and profitable business soon found favour, as all that was necessary was to possess a few Breeder Tulips which could be grown in almost the smallest garden. The growing of tulips from seed had the fascinating possibility that some tulip of exceptional merit and value might be produced. A proof of this is given by Gaergoedt in an answer to Waermondt's question, "How the flowers got so many names." He says: "If a change in a Tulip is effected one goes to a florist and tells him, and it soon gets talked about. Everyone is anxious to see it. If it is a new flower each one gives his opinion; one compares it to this, another to that, flower. If it looks like an 'Admiral' you call it a 'General,' or any name you fancy, and stand a bottle of wine to your friends that they may remember to talk about it."

The whole business was based on confidence, and was quite impossible to control, as one could not see when buying the bulb the flower it

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Fig. 4.—Flora's Fool's Cap;

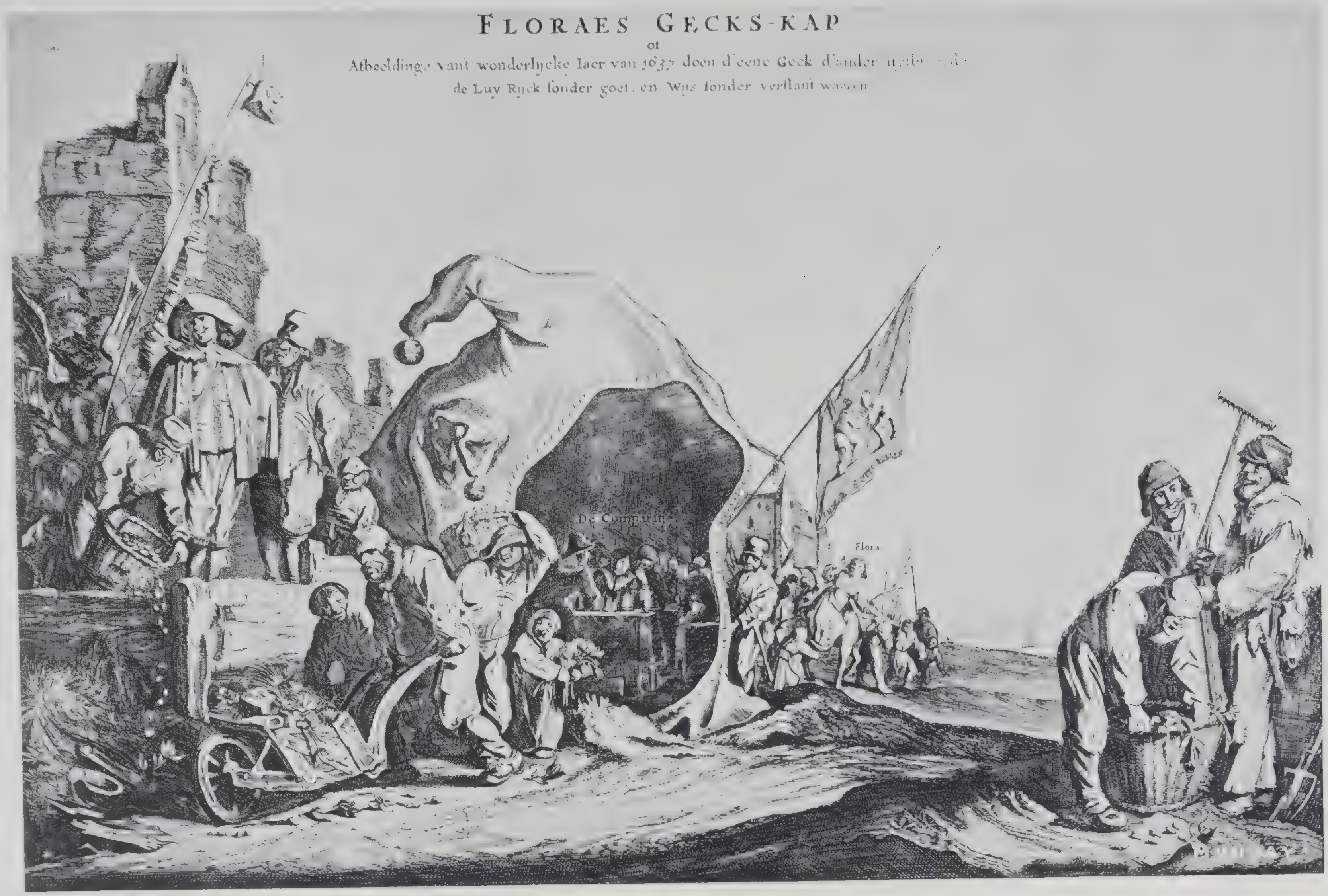
or,

Representations of the wonderful year 1637, when one fool hatched another; the people were rich without property, and wise without understanding.

This print, which appears in the second edition of the conversations of Waermondt and Gaergoedt, published in 1734, depicts a tent in the shape of a fool's cap, in which are several florists weighing Tulips with goldsmiths' scales. Outside hangs a sign, as at an inn, showing two fools fighting, and inscribed "In the two Bulb Fools." In the background is the goddess Flora on an ass being beaten and scolded by disappointed florists. Above the heads of those on the extreme right is a rake or claw, meaning that Flora had raised their hopes of wealth to the highest, but they are now in abject poverty.

On the left is one well dressed and smiling. This is one of the few successful speculators, and he is turning a deaf ear to one of his victims. On the extreme left is Satan with a rod and line at the end of which is a fool's cap; on the line are a great many sale notes of Tulips, and in his right hand is an hour glass, meaning "The time is up."

In the foreground are some florists whose reason has left them, throwing their Tulips on the rubbish heap.


FLORAES GECKS-KAP
of
Afbeeldinge vant wonderlycke Iaer van 1637 doen d'eene Geck d'ander uytbroede
de Luy Ryck ſonder goet, en Wys ſonder verſtant waren
De Compagnie
Flora

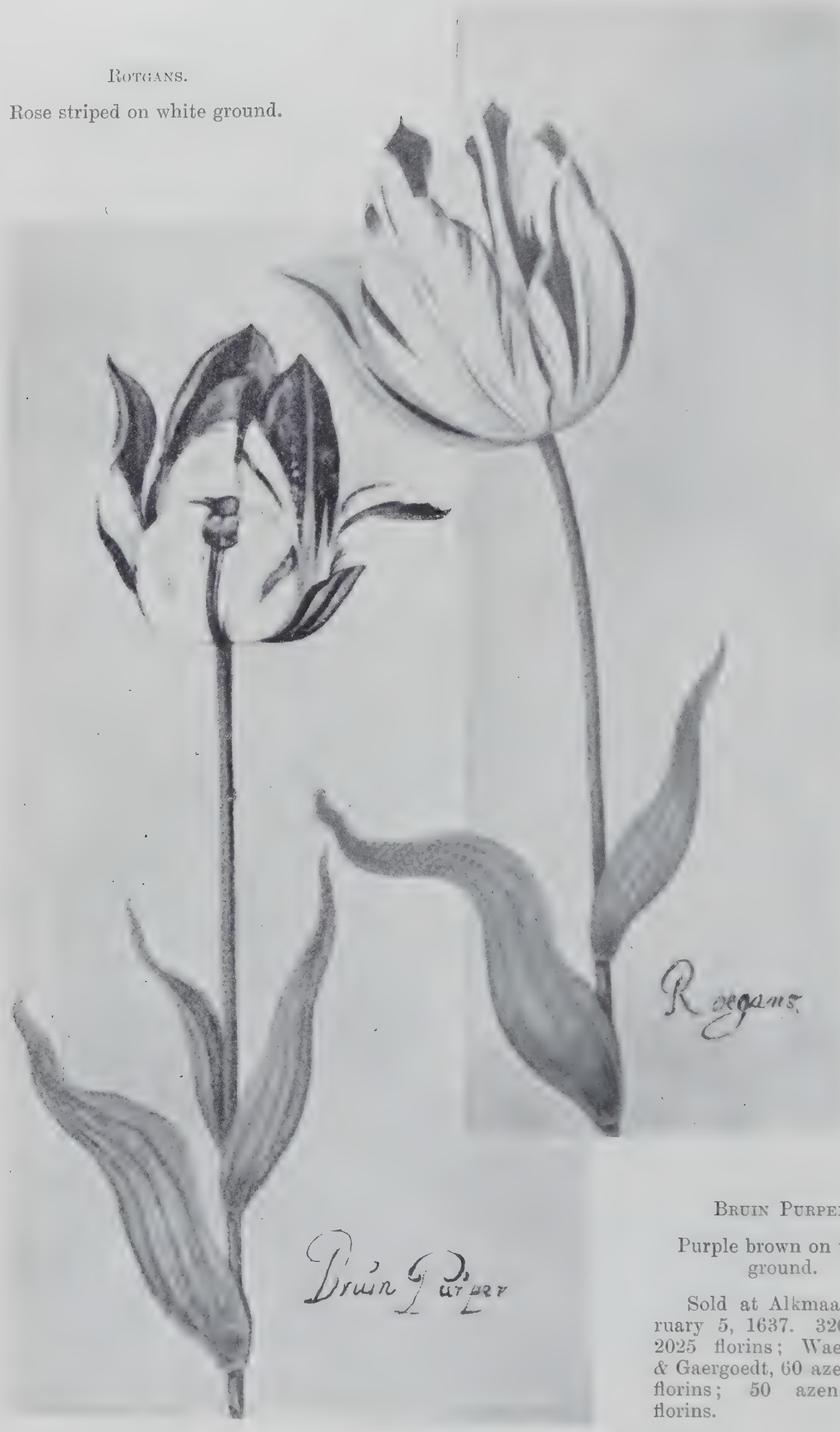
[*Copyright: James Murray & Sons.*

FIG. 4.—FLORA'S FOOL'S CAP.

[*To face p.* 24.

ROTGANS.

Rose striped on white ground.



BRUIN PURPER.

Purple brown on white ground.

Sold at Alkmaar, February 5, 1637. 320 azen, 2025 florins; Waermondt & Gaergoedt, 60 azen, 1300 florins; 50 azen, 1100 florins.

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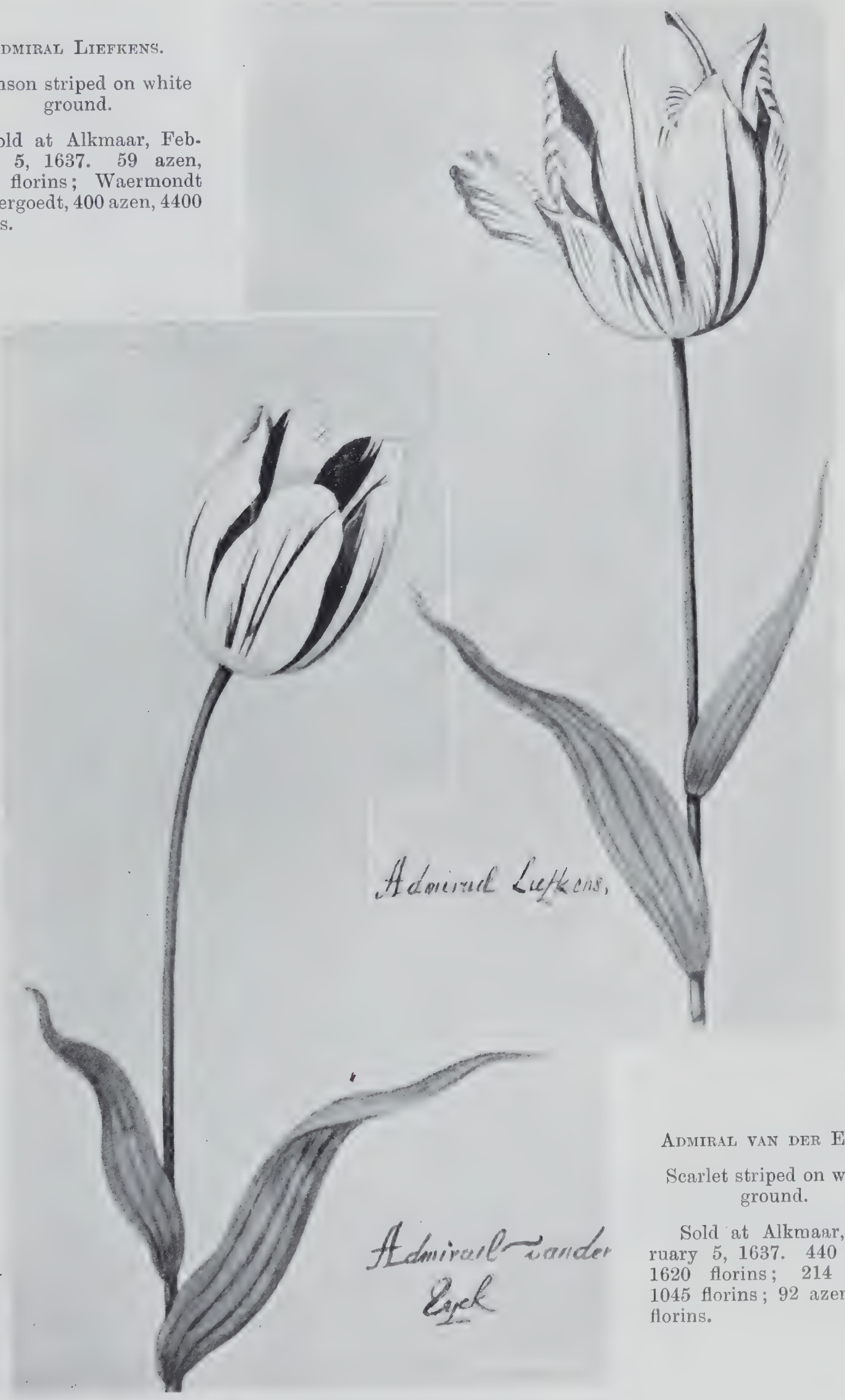
FIG. 5.

ADMIRAL LIEFKENS.

Crimson striped on white ground.

Sold at Alkmaar, February 5, 1637. 59 azen, 1015 florins; Waermondt & Gaergoedt, 400 azen, 4400 florins.



ADMIRAL VAN DER EYCK.

Scarlet striped on white ground.

Sold at Alkmaar, February 5, 1637. 440 azen, 1620 florins; 214 azen, 1045 florins; 92 azen, 710 florins.

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FIG. 6.

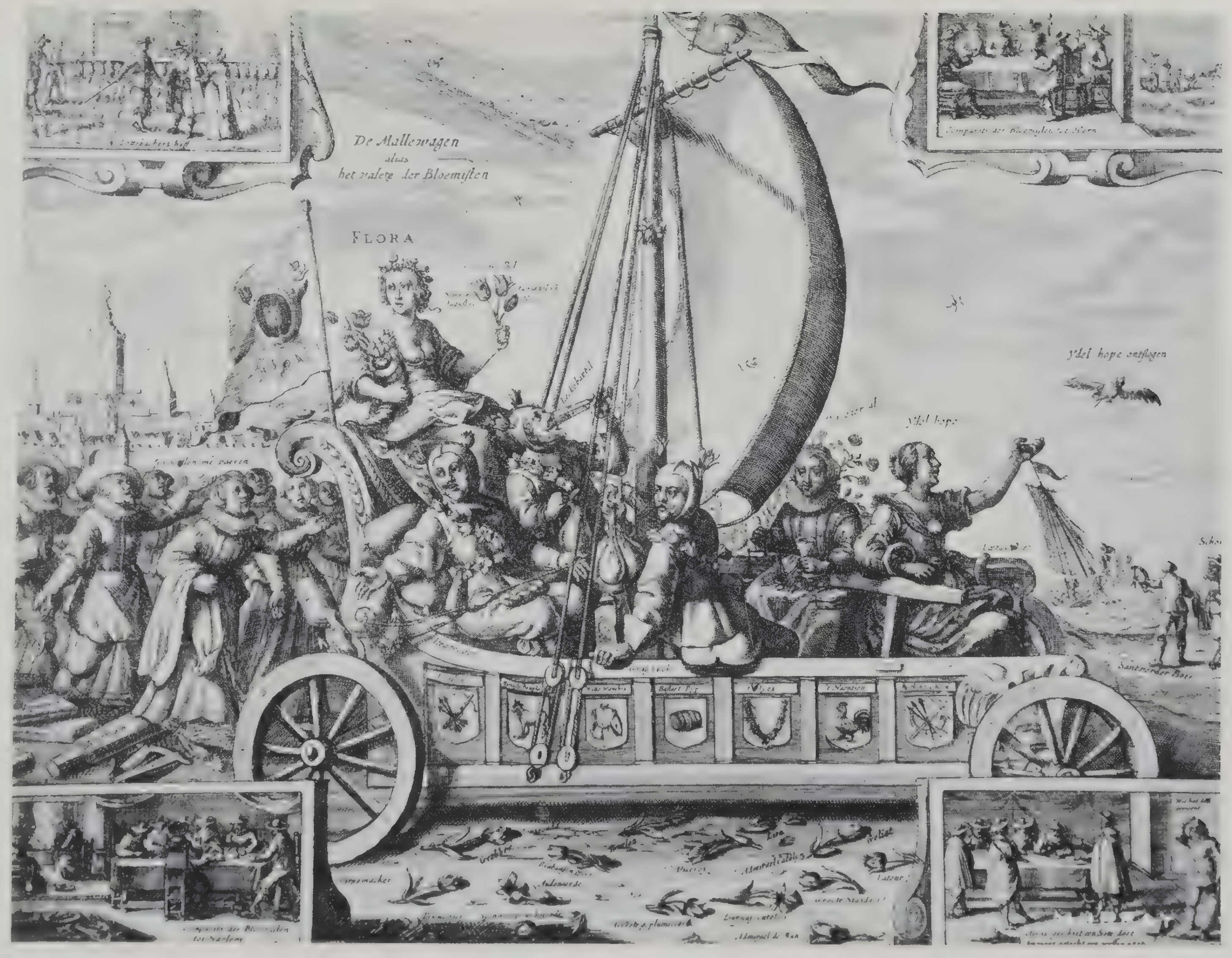

FIG. 7.—THE FOOL'S WAGON.

[Copyright: James Murray & Sons.

[To face p. 25.

would produce, and in the event of the same turning out different from that expected, it could not be asserted with certainty that fraud had been committed. That such fraudulent practices occurred we have ample evidence in "Het t' Zamenspraeken, between Waermondt en Gaergoedt." Gaergoedt says, "It is right that last year I bought a bulb or two that are not what I bought them for, but what is that compared to the numbers bought?" but Waermondt says that his cousin had spoken to people who had bought pounds (in weight) of bulbs purporting to be of such varieties as 'Crowns,' but which were nothing better than *early* double coloured, and even single colours that one may see in any garden.

The "t' Zamenspraeken," or three conversations between Waermondt and Gaergoedt, was published first in 1637 at Haarlem by Adrian Roman, and purports to be the conversations of two weavers, and from these conversations we learn the way business was transacted during the craze. Bulbs that sold at so much each, or by the dozen, were now sold by weight of so many azen (fig. 5), a small weight less than a grain, in the same way as gold or diamonds. In growing numbers tradesmen and artificers adopted the calling of cultivators and dealers of Tulips, selling their tools and their business, and borrowing money on their houses. The constantly increasing profits from their speculations were to be ample compensation for everything, and now began in earnest the Tulip mania. At the commencement bulbs were sold at the time of delivery from the end of June, when they were taken out of the ground, to September, when it was time to plant them again; later the business extended over the whole year, delivery in summer being agreed upon. As now the prices varied according to the demand; speculators contrived to get the Tulip trade into their hands; the bulbs became therefore a secondary consideration as bulbs, and became the object of a regular exchange and gamble.

Collegiums or clubs were formed and held at the inns, which became Tulip exchanges, and we learn that there were two methods of conducting business. The one as selling "met de Borden or Schijven," the other "in het Ootjen." The first is described by Gaergoedt, who says to Waermondt: "If you wish I will sell you a 'Cargasoentje,' and because you are a good man and my special friend, you may have it for fifty florins less than I would take from anyone else, and if you do not

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FIG. 7.—THE FOOL'S WAGON.

The original of this rare print, painted probably by Hendrik Pot, who, according to Burger Musées de la Holland, was from 1633-1639 lieutenant in the Guards at Haarlem, shows us a chaise-like car, in the middle of which a sail is fastened, and this, moved along by the wind, carries Flora, who in her arm holds a horn of plenty in which are Tulip blooms, and in her left hand three blooms – 'Semper Augustus,' 'General Bol,' and 'Admiral van Horn.' In the body of the car are three florists decked out with Tulip blooms, and who are named "Good-for-nothing," "Eager Rich," and "Tippler." In the front of the car are two women, one named "Save All" (Miser) and the other "Idle Hope," and from whom the bird Hope has escaped.

A crowd runs after the car, calling out "We will all sail with you," and in their eagerness discard and trample on their weaving-looms, &c. In the foreground are various Tulip blooms, and on the extreme right is a similar sailing car wrecked. At the corner of the picture are small insets showing Pottebackers Garden and Club rooms at Haarlem and Hoorn.

make 100 rijksdaelers profit, I will make up the difference.'' Waermondt replies: "What a splendid proposal! but suppose I bought the bulb, how shall I get rid of it? Will the people come to me or must I go to them and offer it for sale?'' Gaergoedt: "I will tell you. You must go to an inn; I will show you several, as I know but few where there are no collegiums (clubs). When there you must ask if there are any florists. When you are admitted into their club room, because you are a stranger some will quack like a duck, others will say, 'I spy a stranger,' but do not take any notice. Your name will be written on a slate (or blackboard),'' and then he goes on to describe the method of selling "met de Borden.'' It was not permitted for one to *offer* goods for sale, but one might ask what his neighbour had to sell, thus indicating that he himself had something to sell. He could say for instance: "I have more yellows than I can use, but I want some white.'' Having found a possible purchaser, each, as Gaergoedt tells us, "obtains a small slate or Borden, and each chooses an arbitrator; the seller then goes to the arbitrators, and demands, for example, 200 florins for his goods; the buyer goes to the arbitrators, hears what has been demanded, pretends to be in a rage, and bids as much too low as the seller has asked too much. The arbitrators then fix the value, and write it on the slates of both parties, calling out the amount aloud. If both agree to the amount, the writing must remain upon the slate and the deal is finished. On the contrary, if both rub the writing out, the sale is off; if either agrees and allows the writing to remain, the other must pay the charges as fixed by the club; in some places two stuijvers, in others three, five, or six stuijvers. But if a sale is made the buyer pays half a stuijver on each florin, to the amount of three florins on each transaction of 120 florins or higher. This deposit was known as wine money, the seller allowing half of it back again to the purchaser upon settlement.

The procedure of sales "in het Ootjen'' is also explained by Gaergoedt. Waermondt inquires, "Is there no other way of dealing beside 'met de Borden'?'' Gaergoedt replies, "Yes.'' When the Schijven or Borden have been round, a drawing is made upon the blackboard (fig. 8).

In the upper semicircle is written the thousands of florins, in the middle semicircle the hundreds of florins, and in the circle is "het Ootjen,'' in which the amount the highest bidder receives is written. Under the Ootjen, the tens of florins and stuijvers are written. Now one asks, "Who will put something in the Ootjen?'' If there is one willing, as there always appears to be, he places something in the Ootjen—say it is a "Gouda'' weighing 30 azen. The auctioneer announces that the one who bids the highest shall receive a double stuijver, or three, four, five, or even six stuijvers, according to the custom of the place, and as the company have arranged. The bidding commences at, say, fifty florins, and continues till there is silence, or no further bids than, say, 1508 florins. Then the one at the slate or blackboard says, "Nobody bids, for the first time,'' again, "Nobody bids, before I finish.'' With that he makes three strokes (probably through the amounts written, viz., the thousands of florins, hundreds of florins, and tens of florins) and draws a circle round, and then says, "No one else, once,'' "For the second time,'' "Third,'' "Fourth and last time,'' and with this he draws a stroke through the whole, and if the seller agrees, the bulb is sold, and the wine money is paid as "met de Borden," the purchaser receiving the money promised to the highest bidder, which amounts were known as "Drietjens." The wine money, besides paying for light and fuel, supplied the members of the club with tobacco, beer, &c., for Gaergoedt replies to an inquiry from Waermondt about the wine money, and says: "Yes. The wine money amounts sometimes to much more. I have often been to inns and eaten baked and fried fish and meat. Yes; chickens and rabbits, and even fine pastry, and drunk wine and beer from morning to three or four o'clock at night, and then arrived home with more money than when I left, and if I had speculated about twelve thousand florins the Drietjens would have been as plentiful as the raindrops from the thatched roof when it has rained."

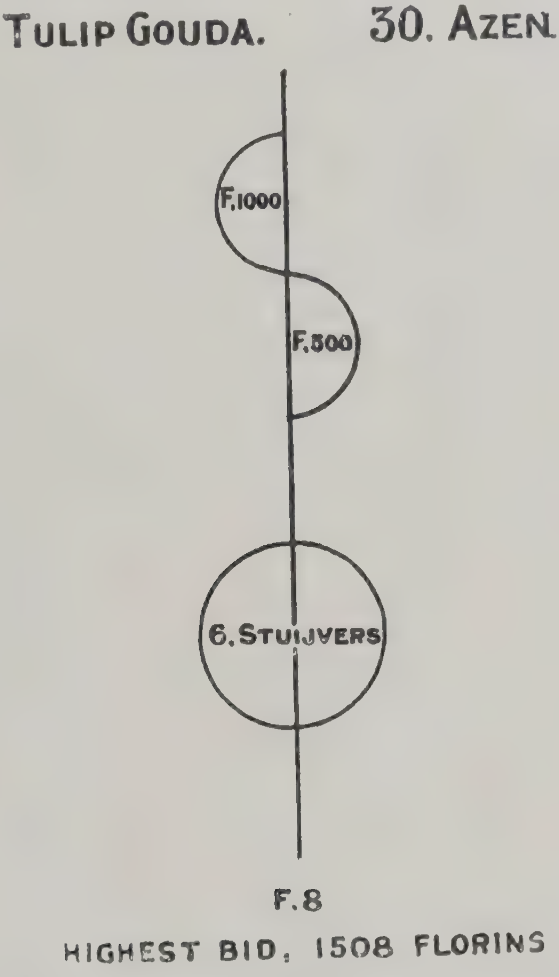
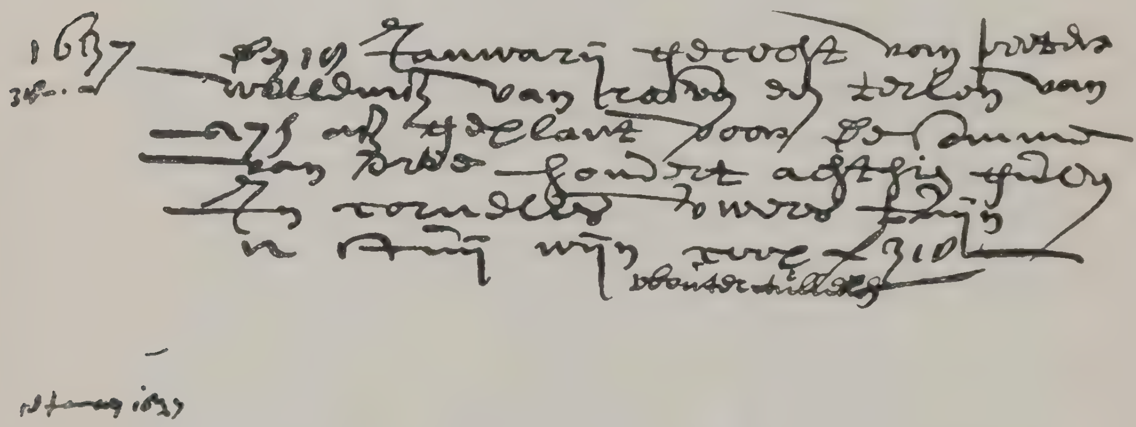


FIG. 8.—DIAGRAM ON BLACKBOARD SHOWING FINAL BID OF 1508 FLORINS FOR THE TULIP 'GOUDA,' WEIGHING 30 AZEN, SOLD "IN HET OOTJEN."

It is not surprising that such an easy and luxuriant life attracted all kinds of ne'er-do-wells, who had no intention of ever paying for the bulbs purchased, but came solely for the "Drietjens," a state of affairs assisted by the fact that bulbs were often sold while in the ground, and were not paid for until delivery some time after, a system which led later to such disastrous complications. The crisis came unexpectedly, principally because connoisseurs had tired of their hobby, and had placed large numbers of Tulips on the market, with the result that bulbs depreciated immediately.

Then came the panic and everyone wanted to sell and no one wanted to buy. Waermondt tells us, that on February 3, 1637, a few florists met at an inn, and endeavoured to push the trade again by holding a mock auction, but without result.

On February 24, 1637, delegates were appointed from the towns of Haarlem, Hoorn, Alkmaar, &c., who met at Amsterdam and drew up the following agreement: "That all sales of Tulips made to the end of November 1636 should be binding. Transactions after that date could be cancelled at the option of the buyer, upon payment of 10 per cent. of the amount purchased to the seller, providing notice is given before March 1637." But this was not accepted. Gaergoedt gives us an idea of the times when, pointing to Waermondt, he says, "When my buyer pays me I will pay you, but he is nowhere to be found."



1637. January 18 bought from Pieter Willemss van Rosven one 'Terlon,'
318— weighing 275 azen when planted, for the sum of Three hundred & eighteen Florins, the Bulb planted in Cornelis Verwer's Garden.
Wine Money 12 Stuijvers. F. 318.
Wouter Tulleken.

[*Copyright: James Murray & Sons.*

FIG. 9.—FACSIMILE AND TRANSLATION OF THE RECORD OF THE SALE OF A BULB.

The Law Courts became crowded and, as no one knew what to do, the Magistrates of the towns were asked to intervene.

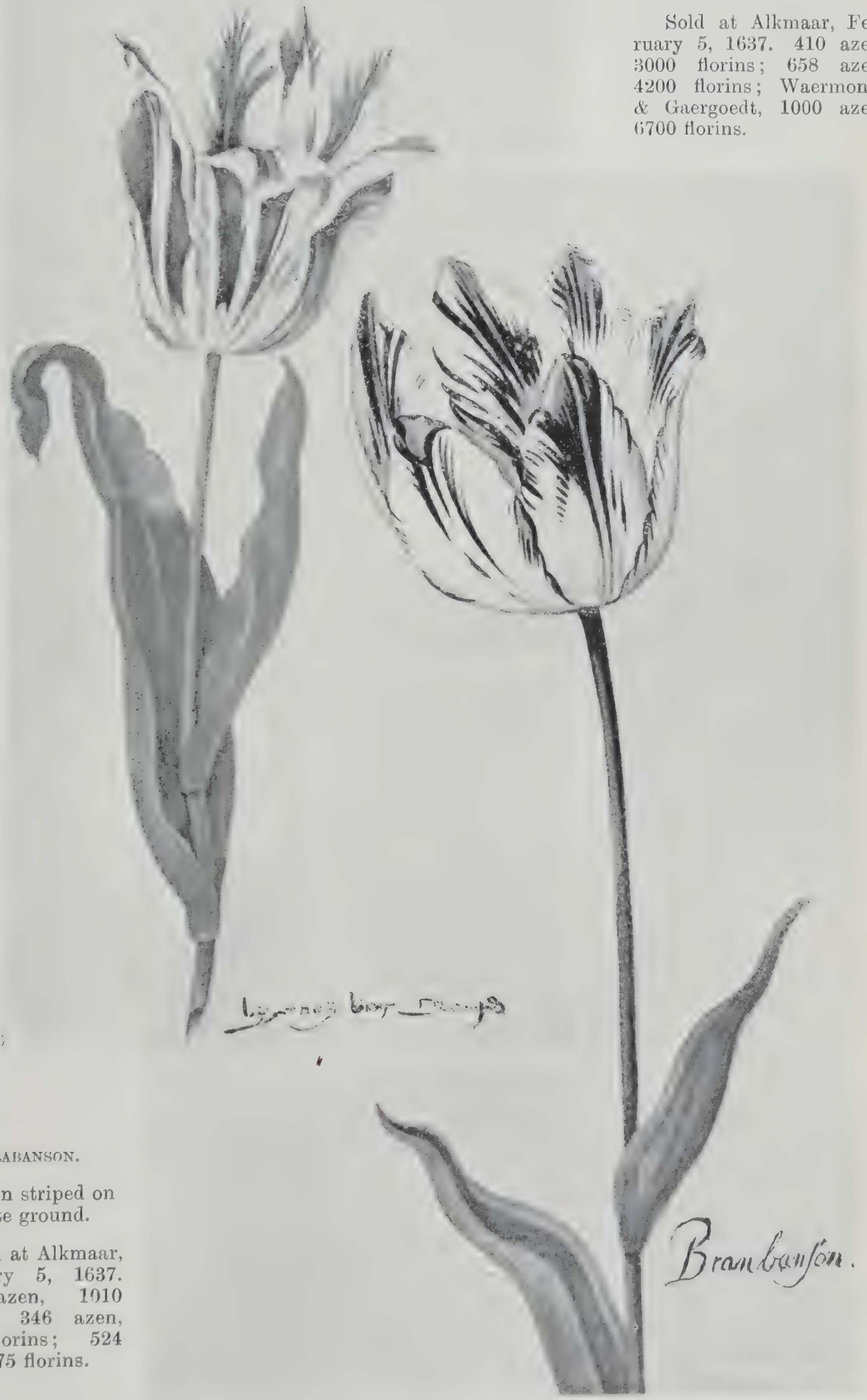
A petition was handed to the Governors of Holland and West Friesland, at The Hague, pressing for the cancelling of all the transactions entered into during the past winter. In their reply the Court declared "there was not enough information in the papers furnished to enable the Court to come to a legal decision, but they advised the Magistrates to endeavour to induce the parties to come to terms in a friendly manner, and to keep the Court informed how matters were progressing."

A decree dated April 1637, issued by the Court of Holland, by which authority was to be given to the sellers to sell all Tulips sold for future delivery, after giving the buyer due notice, or hold them at their own risk, and that the buyer would be answerable for any differences in the amounts realized. Further, it was to be taken for granted that all Tulip contracts were to be suspended, and not acted upon until this matter had

VIJCE ROIJ VAN ORANGEN
(VICEROY D'ORANGE).

Violet striped on white.

Sold at Alkmaar, February 5, 1637. 410 azen, 3000 florins; 658 azen, 4200 florins; Waermondt & Gaergoedt, 1000 azen, 6700 florins.



BRABANSON.

Crimson striped on white ground.

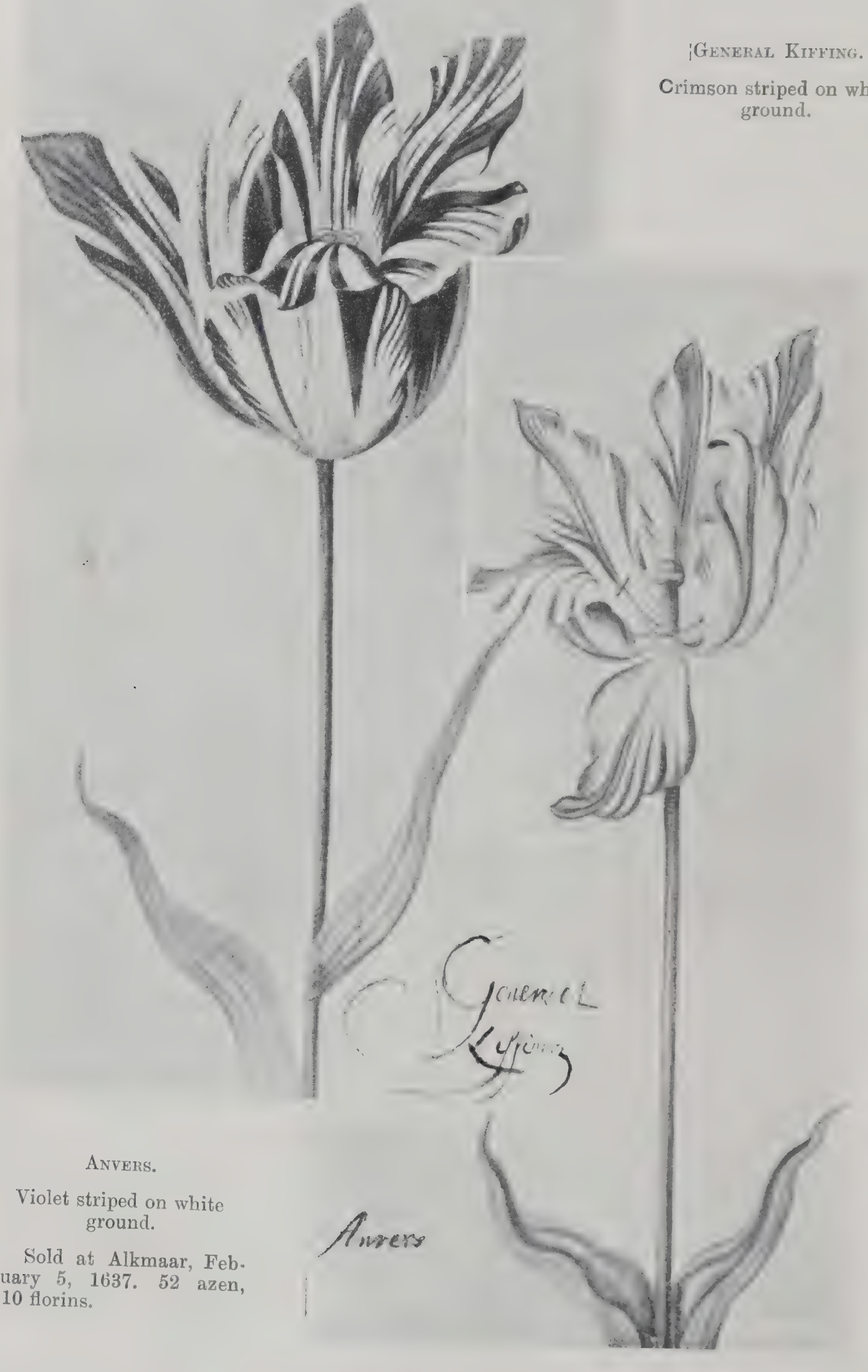
Sold at Alkmaar, February 5, 1637. 542 azen, 1010 florins; 346 azen, 835 florins; 524 azen, 975 florins.

FIG. 10.

[*Copyright: James Murray & Sons*

GENERAL KIFFING.

Crimson striped on white ground.



ANVERS.

Violet striped on white ground.

Sold at Alkmaar, February 5, 1637. 52 azen, 510 florins.

FIG. 11.

[Copyright James Murray & Sons.

[To face p. 29.

been settled by a legal decision. But as the edict promising legal adjustment never arrived, the contending parties were left to settle the matter between them as best they could.

Many discontinued trading and came to terms with their creditors paying 5 per cent. or 10 per cent. to get out of their bargain to take the Tulips. Munting tells us that his father had, in 1636, sold to one in Alkmaar a few bulbs for seven thousand florins, on the following conditions:—That the sale should remain binding if there should be no fall in prices within six months, otherwise the buyer could refuse the Tulips upon payment of 10 per cent., but "as the fall occurred within the six months, my father received seven hundred florins for nothing, but he was obliged to keep his bulbs. He would have preferred to deliver the bulbs, and receive the seven thousand florins."

The caution displayed by the buyer seems to show that he was fully alive to the possibilities of a crisis.

Munting also gives extracts of several of the transactions, from some ledgers kept during the craze, some of which are mentioned in "'t Zamenspraeken" of Waermondt and Gaergoedt.

The example given below shows payment in kind. For one 'Viceroy' Tulip the following goods were given:

		Florins
2 loads of wheat	value	448
4 ,, of rye	,,	558
4 fat oxen	,,	480
8 fat pigs	,,	240
12 fat sheep	,,	120
2 hogsheads of wine	,,	70
4 barrels of 8 florin beer	,,	32
2 barrels of butter	,,	192
1000 lb. of cheese	,,	120
A complete bed	,,	100
A suit of clothes	,,	80
A silver beaker	,,	60
Total		2500

The following is another example of a bookkeeper's entry: "Sold to N. N. a 'Semper Augustus,' weighing 123 azen, for the sum of 4600 florins. Above this sum a new and well made carriage and two dapple grey horses and all accessories, to be delivered within four weeks, the money to be paid immediately." Munting also gives a list of bulbs sold by weight in public auction, among which are:

		Florins
59 azen	Admiral Liefkens	1015
214 ,,	Van der Eyck	1620
523 ,,	Grebba	1485
106 ,,	Schilder	1615
200 ,,	Semper Augustus	5500
410 ,,	Viceroy	3000
1000 ,,	Gouda	3600

Referring to the 'Viceroy' sold in kind, we find at that time the value of a sheep was ten florins, or 16*s.* 8*d.* One can estimate what an enormous amount these sums represented.

In 1733 and 1734 there was a minor revival of the mania, when enormous sums were paid for Double Hyacinths, which occasioned the reprinting of the ‘ ’t Zamenspraeken ’ of Gaergoedt, and Waermondt as a warning; and in the ‘Florists’ Magazine’ of 1836 (vol. 4, p. 215) I find the following: “The well known taste of the Dutch for Tulips is not diminished. The new Tulip called the ‘Citadel of Antwerp’ has been purchased for 16,000 francs (£650 sterling) by an amateur at Amsterdam.”

At the present day new varieties sometimes change hands for large sums, but a repetition of the mania is not likely to occur.

CUCURBITACEOUS FRUITS IN EGYPT.

By Mr. T. W. Brown, F.R.H.S.

Most of the crops in Egypt are grown under irrigation, which necessitates the adoption of methods of cultivation different from those followed in countries where rain is the immediate source of the moisture in the soil. Again, in districts where the ancient system of flooding the land once each year is followed, the agriculture is necessarily different from that practised on land now under perennial irrigation and watered at all seasons. If we also remember that the water-wheels, ploughs, and other implements employed are of the most ancient patterns, it will be seen that the peculiarities of Egyptian agriculture are varied and picturesque.

Many Egyptian varieties of cultivated plants are of special interest. In this respect the somewhat numerous varieties of Egyptian cotton will at once occur to the mind, but the Cucurbitaceous plants are quite as interesting and perhaps not so well known as the cotton. Although they are not indigenous to the country, the introduction of several of the most useful members of the family must have taken place at very remote periods.

"We remember the fish which we did eat in Egypt freely, the cucumbers and the melons," was the plaint of the Israelites after leaving the land of their captivity. Whatever fruit may be meant by the word 'melons' in this passage, it is interesting to note that similar regrets are very often expressed in regard to the sweet melons and water melons of the present day by people leaving Egypt.

The kind of sweet melon most commonly grown, and known in Arabic as 'Shammam,' is a variety of the same species as the Queen Anne's Pocket Melon—*Cucumis Dudaim*. The latter plant is also occasionally met with, but, as in other countries, it is of ornamental value only. It is called 'Abou Shammam,' which means "the father of Shammams."

The ordinary 'Shammam'—*C. Dudaim aegyptiaca*—is a most delicious melon. There are three varieties of it, viz. the 'Geyeidy,' 'Weraki,' and 'Besusi.' The first is by far the most common. It is oblong in shape, about 30 cm. long, of an average weight of 2½ kilos., lightly furrowed, dark green, but becoming yellow between the furrows when ripe. The flesh is greenish white, melting and sweet. The 'Weraki' is a larger variety, but is less sweet than the 'Geyeidy.' The best variety is the 'Besusi.' The fruit is short, but it has a deeper and sweeter flesh than the others. This variety requires a comparatively heavy soil, and is grown chiefly on the island of Abou el Gheit, and Besus to the north of Cairo, whence its name. Owing to the delicacy of the skin, the greatest care has to be taken to protect the fruit from the direct rays of the sun. For this reason the cultivators usually sink the immature fruits in the soil, and dispose the branches so as to form a thick shade above.

[illegible] in the "Contributions à la Flore d'Egypte" mentions a fruit which is intermediate between the 'Shammam' and the 'Abou Shammam,' but I have not seen it.

A very long club-shaped melon is sometimes cultivated on the banks of the Nile. This resembles the 'Shammam' in colour and perfume, but is tasteless, and otherwise of poor quality. At Cairo it is called 'quattah saidy.'

The melons belonging to *Cucumis Melo* are known in Egypt as 'qaoon.' They are represented by several varieties, all, however, being either netted or winter melons. The Cantaloupes are scarcely known outside the gardens of a few Europeans. The best known of the netted melons is the 'qaoon Santaouy.' This is a small, globular, and strongly-scented fruit. It is somewhat deeply furrowed, and has a light yellow skin with a close network of raised lines. The flesh is thin, light orange coloured, and very juicy. It is a late variety of melon, and does not appear in the market until the latter half of July, whereas the 'Shammam' is ready in the middle of May.

The 'Santaouy' is grown chiefly in the Delta, but a netted melon is cultivated in Upper Egypt also, under the name of 'qaoon saidy.' It is said to attain a large size, but the specimens which I have seen were not remarkable in this respect. It is a globular melon, somewhat deeply ribbed, and with a dark brown skin mixed with yellow and green. It has a thick sweet flesh of good quality.

Of the smooth-skinned melons, the most important is that known as the 'qaoon beledi,' which, like the 'qaoon saidy,' is cultivated chiefly in Upper Egypt. It is globular in form, and has a light yellow skin without furrows. The flesh is white, thick and very sweet, the average weight of the fruit being about 3½ kilos. At Cairo this is called 'qaoon Doumeyry' and sometimes 'qaoon Sohagi,' but neither this nor the 'qaoon saidy' comes to Cairo in large quantities. Other varieties are imported in large quantities from Smyrna, after the middle of August, when the Egyptian melons (Shammam) are finished. Mention must be made of an oblong melon called 'qaoon mahanaouy.' The only place where I have known this to be cultivated is Sohag, in Upper Egypt. A native grower of that place informed me that it sometimes attains a length of 50 cm. It is, however, tasteless and of little value.

Apart from these long melons, the most remarkable Cucurbitaceous fruit in Egypt is that known as 'agour'—*C. Melo Chate*, L. (Naud). As De Candolle points out, the name of the cucumber in modern Greek is 'angouria,' "from an ancient Aryan root which is sometimes applied to the water-melon, and which recurs for the cucumber in the Bohemian 'agurka' and the German 'gurke,' &c." The 'agour' of the Egyptians, however, bears no resemblance to a cucumber. It is oval in shape, but gradually tapering to a point at both ends. The length of an average-sized fruit is about 40 cm. It has a reddish-brown skin, covered with a close network of raised lines. The flesh is thin, orange-coloured, juicy, but not sweet. The 'agour' matures very quickly and appears in Cairo market in April. Coming at a time when no other melon fruits are available, it forms an important and popular food among the natives. It is usually eaten raw with sugar.

In Egypt melons are grown largely on the light loam found on the islands and the banks of the Nile when the river is low. The following is the system of cultivation practised. Trenches running in a transverse direction to the prevailing wind are dug in the silt bordering the water. The trenches are made 20 cm. wide, 30 cm. deep, and 90 cm. apart. A layer of decayed pigeon manure is placed in the bottom of the trenches, which are then refilled with soil. Farmyard manure is used where pigeon dung is not available, but does not give such good results. The seed is soaked in water and germinated before sowing. It is then sown in holes about 40 cm. apart, and a row of maize-stalks fixed in the soil by the side of each trench, in such a manner that the maize leans over the young plants and protects them from the wind, while leaving them exposed to the sun. Where there is a danger of the plants being covered with drifting sand, low barriers are constructed around the plots. Four or five seeds are sown in each hole, but when the seedlings have attained three or four leaves they are thinned so as to leave one plant only. During the growth of the crop the soil is hoed to keep it moist and loose. When the fruit begins to appear, the maize-stalks are removed and a second trench is often dug parallel with and close to that in which the plants are growing. This is filled with manure and soil in the same way as the first, and forms an additional supply of food for the plants. The best fruit on each plant is allowed to remain, the others being removed when small. These small fruits are in the case of the 'Shammam' known as 'sirt,' and in the case of the 'agour' they are called 'hersh.' They are eaten in the same way as cucumbers, but are in much greater demand and bring better prices than the latter. The 'Shammam' is grown almost always as a river crop. As the roots descend 60 cm. to 70 cm. into the soil, the water-level is sufficiently near the surface to enable the plants to grow without irrigation. The 'qaoon Santaouy' on the other hand, is cultivated chiefly on the high sandy lands on the edge of the desert, in which situations it is of course necessary to water the plants. The preparation of the ground, however, is the same. The 'agour' requires a more compact soil than the melons, and is therefore grown chiefly on basin lands which have been flooded during the previous autumn. In this case the seed is sown on the edge of a shallow furrow, and the manure applied when the seedlings have four or five leaves. Water melons are cultivated in the same way as sweet melons. They can, however, be grown on much poorer ground than the 'Shammam' and in situations where the sand is too loose for the 'Santaouy.'

The water melon is a very important crop, and is sown in large areas both on the river banks and inland. The number of varieties of red-fleshed water melons is large, but many of them are not well defined, intermediate forms making classification difficult. An attempt to do something in this respect was made last year by the Horticultural Society, by collecting and comparing fruits from various parts of the country. It was, however, found that it would be necessary to cultivate all the varieties together on the same soil for one or more years, in order to arrive at definite conclusions. The most distinct varieties are (1) the 'beledi,' a rather large, light green or grey fruit of medium quality, (2) the 'saidi,' which is dark green and has a firm, sweet flesh, and (3) the

'Yalloon,' which is a plain light-green fruit with a red flesh of excellent flavour. Almost all the varieties have oblong forms in addition to the ordinary shapes. These elongated forms are distinguished by the name of 'nims' (ichneumon) and are spoken of as 'beledi nims,' 'saidi nims,' &c. Of yellow-fleshed water melons, two distinct varieties are cultivated, viz. the 'hegazy' and the 'Stambouly.' The latter is somewhat rare. Both are thin-skinned fruits of excellent flavour. The 'abou-hazam' is a variety in which the flesh is rose-coloured in the centre and yellow next the skin. A white-fleshed water melon exists in Upper Egypt, but I have not seen this.

The cucumbers constitute another crop of importance in Egypt. Of the ordinary cucumber (*Cucumis sativus*) only one variety is grown. It is a strong-growing plant, with fruits about 25 cm. long at maturity. They are, however, always gathered when small, and in this state the flesh is crisp and of excellent flavour. In Arabic this cucumber is known as 'khiyar.' The snake cucumber (*C. flexuosus*, L.), although not of the same importance as the common cucumber, is, however, grown on a large scale. In habit of growth and general appearance it resembles a melon plant. It produces cylindrical twisted fruits about 50 cm. long. They are light blotched with dark green, and covered with soft woolly hairs. This is the 'fakus' of the Arabs. It is not gathered until it has attained a large size, when it is consumed as a salad chiefly by the natives. The hairy cucumber (*C. pubescens*, Willd.) is another plant which resembles the melon, but the leaves are covered with short prickly hairs. It is known as 'quattah firany' in Arabic. The fruits are cylindrical, generally straight, and about 25 cm. long when full grown. The skin is white, light green, or dark and light green mottled. It is covered with soft hairs and often striated with depressed lines. The fruits are gathered when small and eaten as a salad, or stuffed with meat and rice and afterwards cooked.

Of the genus *Cucurbita* the most important plants in Egypt are the vegetable marrows. These are in the market at almost all times of the year. The varieties most commonly grown are (1) a green bush marrow known as 'cosa Skandarani' and (2) a running variety with white fruit known as 'cosa beda.' As in the case of cucumbers, the fruits of vegetable marrows are always gathered when quite small. Apart from the vegetable marrows, the only plant belonging to *Cucurbita Pepo* cultivated by the fellaheen is a large globular pumpkin called 'qara magreby.' The fruit attains a diameter of about 35 cm., and a weight of 10 kilos. The flesh is white, and when cooked with rice and meat forms an agreeable dish.

This plant, however, is not so common as the Naples Gourd or 'qara Stambouly' (*C. moschata*), which is grown in all situations, with or without irrigation. The flesh is somewhat dry, of a pale orange colour, rather sweet when ripe, and slightly scented. As the fruit keeps in good condition for six months or more it is in use at all seasons. In addition to the ordinary variety, which has an elongated fruit constricted in the centre, a form with globular fruits is sometimes met with.

The mammoth pumpkins—*C. maxima*—are grown to a very small extent in Egypt. That most frequently seen is somewhat oval in shape, with an average circumference of 1·25 m., and an average weight of 17–20 kilos. In the Cairo market it is known as 'qara Soudani,' but this is evidently a misnomer. The retail price varies between 4*s*. and 6*s*. each.

The plants which now remain to be mentioned are the luffa, or sponge gourd, and the calabash. Although luffas are not exported to a great extent from Egypt, large quantities are used in the country for washing cooking-utensils, &c. They are grown everywhere—on fences, trees, out-houses, &c., but there is a ready sale for all produced. The ripe unprepared fruits bring from 10*s*. to 16*s*. per hundred. Three varieties, all belonging to *Luffa aegyptiaca*, are grown. These differ chiefly in the length and thickness of the fruit. The 'rumi tawil,' which is the kind most valued, produces fruits 45–50 cm. long.

The fruits of the calabash—*Lagenaria vulgaris*—assume many different forms. Some are used as receptacles for water, while others are used as floats for fishing-nets and as household ornaments. The only variety which is of any value as a food plant is that known as 'qara atraj.' This has a straight cylindrical fruit, one metre or more long, with a light green skin and greenish pulp. Gathered in a green state, they are eaten cooked, or they may be allowed to ripen and be made into jam.

The cultivation and marketing of the Cucurbitaceous crops give employment to large numbers of people. Donkeys laden with cucumbers and vegetable marrows may be seen coming into Cairo any morning during nine months of the year. Sweet and water melons are chiefly collected in boats and brought to Cairo by river. These cargos are mostly discharged at Giza, whence they are taken by camels, donkeys, and conveyances of every kind to the market, shops, &c. The unloading of the boats in the early morning forms one of the busiest and most picturesque scenes in Egypt. Large numbers of water-melons and 'agours' are also brought direct from the fields to Cairo by camels.

The returns from an acre of melons or water melons vary between £20 and £40. As the expenses do not exceed £10, good profits are made by the cultivators. In view of this fact and of the large quantities of fruit grown, it is somewhat surprising that Egypt imports melons and water melons to the value of £66,000. In spite of the enormous consumption, however, there is no doubt that Egypt could quite easily supply her own wants. The principal reason why she does not do so at present is that the number of people who understand the cultivation is limited. The fellah is very conservative, and unless he has been taught to grow melons by his father or other relation, he is not likely to commence later in life.

Experiments carried out on a large scale have also shown that an extensive and highly lucrative export trade may be established in long cucumbers and melons with Europe in late autumn. For the development of this part of the industry, however, it will be necessary to look to European enterprise.

THE LILY OF THE VALLEY.

By Miss H. C. Philbrick, F.R.H.S.

> "Awake, O north wind; and come, thou south; blow upon my garden that its spices may flow forth."

Convallaria majalis—the Lily of the Valley. What a host of memories its very name conjures up! And we are carried away captive, for none can remember the time when he did not know and love this flower of fragrance; its beauty and its purity are all its own. Most of us are probably much more familiar with the Lily of the Valley as a garden flower than as a wild plant, but it is a true native nevertheless, and may in many places be found in abundance. You will bear in mind that it really is a plant of the woods, so that it is only there, or in sheltered coppices, that there is any reasonable hope of finding it. We may here, however, advantageously point out that in foliage and general effect the broad-leaved garlic is very similar to the Lily of the Valley (save in perfume), and both are found in the same situation at the same period of the year and that more than one of our friends have been previously disappointed by confounding the two. Yet I think we shall all agree that the pure white clustering starry blossoms of the garlic are very beautiful in themselves, and have a full claim to be admired for what they are—not scouted for what they fail to be.

Londoners will hear with interest that in the time of the great botanist Ray, the Lily of the Valley grew abundantly on Hampstead Heath.

In 1590, in St. Leonard's Forest near Horsham in Sussex, where the Lily of the Valley used to be seen in profusion, the local legend tells us that the patron saint of the district, St. Leonard, waged a mortal combat for many hours with a great and terrible dragon. Though in the end victorious, the saintly dragon-slayer by no means escaped scatheless, and these large masses of snowy blossoms scattered over the forest sprang from his blood shed during the dread encounter. Anyone who in this sceptical age has doubts can go and see the flowers for himself. In the east of England, the Lily of the Valley has made a dwelling place in both Essex and the sister county Suffolk, notably in Woodham Mortimer, the High Woods near Colchester, and in Bentley Woods near Ipswich. It is also common in many other English counties, very local or almost wanting in others, while in Ireland and Scotland it would appear to be scarcely indigenous, though it is indigenous in most parts of Europe from Italy to Lapland. In the woods of Eileriedle, in the neighbourhood of Hanover, the ground is covered with them; these woods are visited every Whit Monday, we are told, by numerous parties from Hanover, who gather these delightful May flowers.

It is sometimes called the May lily—many of the old names of plants, as the pasque flower, Lent lily, St John's wort, and numerous others, having reference to the date of flowering. It is in France the "Muguet de Mai"; in Germany the "Maiblume." Its specific name, majalis or maialis, signifies "that which belongs to May," hence the old astrological books place the plant under the dominion of Mercury, for Maia, the daughter of Atlas, was the mother of Mercury or Hermes. It is also called Convall Lily and Lily Constancy by the old herbalists, and in some parts of the country its local name is "Ladder to Heaven." Its spotless purity of colour and lowly humility were probably the cause of the bestowal of the last name—a name that has no doubt descended from medieval times. The old monkish herbalists often based their nomenclature on associations of a religious character, and united their plant names with the legends of the saints or the services of the Church's calendar.

"To the curious eye
A little monitor presents her page
Of choice instruction; with her snowy bells,
The Lily of the Vale. She not affects
The public walk, nor gaze of noonday sun;
She to no state or dignity aspires
But, silent and alone, puts on her suit,
And sheds her lasting perfume, but for which
We had not known there was a thing so sweet
Hid in the gloomy shade."—HURDIS.

Again—

"And their breath was mixed with fresh odours sent
From the turf like the voice of an instrument."

As an ornamental plant few of our native species have a greater claim to a place in the garden, and may I say in our hearts, for few others can boast of so rich a fragrance or so delicate a beauty; added to these charms it is most easy of cultivation, requiring only to be placed in a shaded corner. The generic name Convallaria is from the Latin word for valley, and is bestowed in obvious reference to the sheltered woodland dells in which the Convall Lily finds a congenial home. The root of the Lily of the Valley is fibrous and perennial, extending a little below the surface of the ground, and reaching to a considerable distance. The leaves grow in pairs, their stalks sheathing one within the other. One of these leaves is often larger than the other, as all know, and also that they are very simple in form and deeply ribbed; when forced the leaves are of a much paler green and finer texture, and they take a deeper and more sombre green out of doors as the season advances. The flower stalk springs from the root and is about equal in length to the leaves. It bears a loose raceme of drooping bell-shaped flowers of pure white; hence in Beaumont and Fletcher's sonnet on the spring we find them referred to as "lilies whiter than the snow." In its wild state the blossoms are rarely succeeded by the fruit, but it produces it readily under cultivation. The fruit is rather a large berry, something in size between a fine black currant and a small cherry, and of a brilliant orange red. Our friends in the Antipodes are sighing for the lily fair, and have, I have recently been told, tried more than once to get the plants from England; but they will not, as our friends north of the Tweed have it, "carry," and ere they arrive they are dead. The only resource left is to send out the seed, and this I am doing.

It is hardly necessary to say much upon the mode of cultivating this universal favourite: it delights in moisture and partial shade, and in a good light soil it loves to penetrate its fibrous roots. It is found in mountain copses sheltered by shrubs, and in the forest under trees. It is well to have a plantation of Lilies of the Valley upon a southern aspect if you want the flowers early, and in succession, for by this means they may be gathered a fortnight or three weeks earlier than otherwise—I am of course dealing with the days before retarded lilies were known—give rotten manure as surface dressings and plenty of moisture during active growth. The chief point to guard against in outdoor cultivation is frost, this being destructive to the blooms which appear with the leaves. A few spruce or other evergreen branches placed sparsely over the beds afford efficient protection, and a beneficial shelter encouraging growth. Preference should be given to a soft loamy soil well enriched with rotten manure, though sometimes fine lilies may be grown in rather heavy loam. In preparing soft loam it will be best to give a liberal admixture of leaf soil and sharp sand. Whatever the soil may happen to be it should be moderately firm before planting. The best time for planting is in the early autumn, as soon after the foliage has decayed, selecting the crowns singly and dividing them for beds likely to remain undisturbed for several years. The crowns may be planted two, or even three inches apart, as they do not become crowded so soon as to require thinning out. It is a good plan to cover the surface after planting with one or two inches of rotten manure, thorough maturity being secured only by constant applications of water, weak manure-water being the most efficacious. Treated thus with annual dressings of manure the beds will continue in good "heart" for years, and bear fine blossoms in abundance. When the plants become crowded with shoots they should be thinned out, or, better still, lifted and replanted, for weakly or blind crowns tend to retard vigorous growth. The Lily of the Valley is now largely forced into flower early, the roots being often imported from the Continent, where they are grown and prepared for the purpose. It may be naturalized, too, in any place sufficiently shaded and moist, and it soon spreads into broad masses. There is a variety with foliage striped with gold and another with double flowers, but the latter is not pretty. The finest form is called "Fortins," which is much more robust than the common kind, having larger flowers; but in spite of this I think the smaller and familiar Lily of the Valley we found in the woods in our childhood is the one which lies the closest to our affections.

The Lily of the Valley possesses a most beautiful curve, added to its many other charms, which makes it so perfect as a decorative flower, and when associated with blue forget-me-not—Myosotis palustris, found growing by river banks, streams, and ditches in June, July, and August—the combination is delightful—the harmony is perfect. I would suggest that the lilies be arranged at the top of a glass vase, the forget-me-not at the base. Such vases are easy to get, and clear glass (not coloured) lends itself best, I think, to this arrangement, coming nearer to nature, and so nearer to the beautiful and the true.

CHINESE PÆONIES.

By Rev. W. Wilks, M.A.

The Pæony found so very commonly in gardens is *Paeonia officinalis.* It has three well known double varieties—one a deep blood-crimson, another dark rose fading paler, and one *called* white which opens a pale rose-pink and gradually fades to a dingy, transparent white; it is often known as 'Adelaide.' Of these the first-mentioned is by far the best. All three are comparatively common and have a distinctly unpleasant smell, reminding one a little of crushed 'ladybirds.'

Why, then, are the Chinese Pæonies so much less often met with? Is it that people do not know of them—do not know how many varieties there are, and of what lovely colours and glorious form and pleasant scent? for most of them surpass the modern rose in fragrance. Or is it more probable that people in this twentieth century are in such an impatient hurry that they will not give the Chinese Pæony the time it needs to establish itself and grow into the marvellously beautiful plant it will become in four to five years from planting? Their cultivation is of the very easiest. They should be planted, only just below the surface, in the last week in October or the first in November, in ground that has been double-trenched, as they love to send down their thick, fleshy, tuberous roots deep into the soil. Plenty of good rotten dung should be dug in in the trenching, as, like roses, the soil can hardly be too rich for them. They want abundance of room and light and air and moisture (but not undrained wetness), but if sheltered from the prevailing wind the less will the blossoms suffer. If grown, as they deserve to be, in beds, they should have a top dressing of old rotten dung put on at the end of February, and if in at all a dry position they should have plenty of water, with a little chemical manure from the end of May till blooming time is over. To have fine flowers the very weak shoots should be removed at an early stage of their growth; and later on the side-blossom buds should be removed from the strong shoots that have been left, as soon as they are negotiable. A well-grown plant will require three or four short stakes on the outside of the clump, with encircling tar twine, to prevent the heavy blooms bringing the whole plant to the ground.

Among the very best varieties are—

'Canari,' white with a faint tinge of yellow.

'Charles Binder,' and 'Ceres,' very similar with pink guard petals and yellow and white centre.

'Duchesse de Nemours,' the best white with ivory centre. It is often sold under the name of 'Whitleyi.'

'Alba Superba,' the largest of all, loosely double and worthy of all the superlatives imaginable. (Fig. 12.)

'Triomphe de l'Exposition de Lille,' silver-pink with yellow stamens, loosely double.

'Solfaterre,' good early white tinged with yellow.
'Madame Callot,' pale flesh, very large and very double.
'Philomèle,' bright pink guard petals with a yellow centre.
'Reine des Français,' pale pink guard petals with white and pink centre very beautiful.
'Belle Châtelaine,' a very fine pale pink.
'Miss Salway,' ivory yellow.
'Festiva Maxima,' paper white with crimson splashes.
'Monsieur Rousselon,' loose blush white with prominent yellow stamens.
'Princess Beatrice,' bright pink guard petals with ivory and pink centre, somewhat like 'Reine des Français.'
'Princess Nicholas Ribere' or 'Ribesco' (it goes under both names), silver pink guard petals, ivory yellow and pink centre.
'Alba Maxima,' another good white.
'Princess Patricia,' blush guard petals with ivory centre.
'Lady Leonora Bramwell.' For those who like a pink that seems as if it had a tinge of blue in it this is a very fine plant; very free-blooming, strongly rose-scented.
'Marquise de Lorne,' silver pink with yellow stamens.
'Marie Jaquin,' exactly like a white water lily, very beautiful.
'Vanderbilt,' pink guard petals, yellow centre.
'Frances' and 'Alexandrina,' two good pinks.

But perhaps this list is too long. If so take—

'Alba Superba' 'Duchesse de Nemours' and 'Festiva Maxima,' three very fine but quite distinct whites.
'Reine des Français' and 'Philoméle,' both indispensable.
'Belle Châtelaine,' 'Frances,' and 'Marquise de Lorne,' three distinct shades of pink.

Add to them 'Princess Nicholas Ribere' (or 'Ribesco') and 'Marie Jaquin,' and you have ten of the best. But a really great difficulty is to get them true to name. For instance, a worthless pink has done duty before now for the glorious white 'Duchesse de Nemours' which is sometimes labelled 'Double Whitleyi.' 'Reine des Français' and 'Philomele' are also sent out under misleading English names, and now that intercourse with the Continent is so easy and so frequent the practice of rechristening foreign-raised plants by English importers cannot be too strongly condemned. The figures are from photographs taken in the garden at Coombe House, where these wonderful plants are grown to the utmost perfection, and where they have stood undisturbed for eleven years, giving an equally magnificent display annually since the third year from planting.

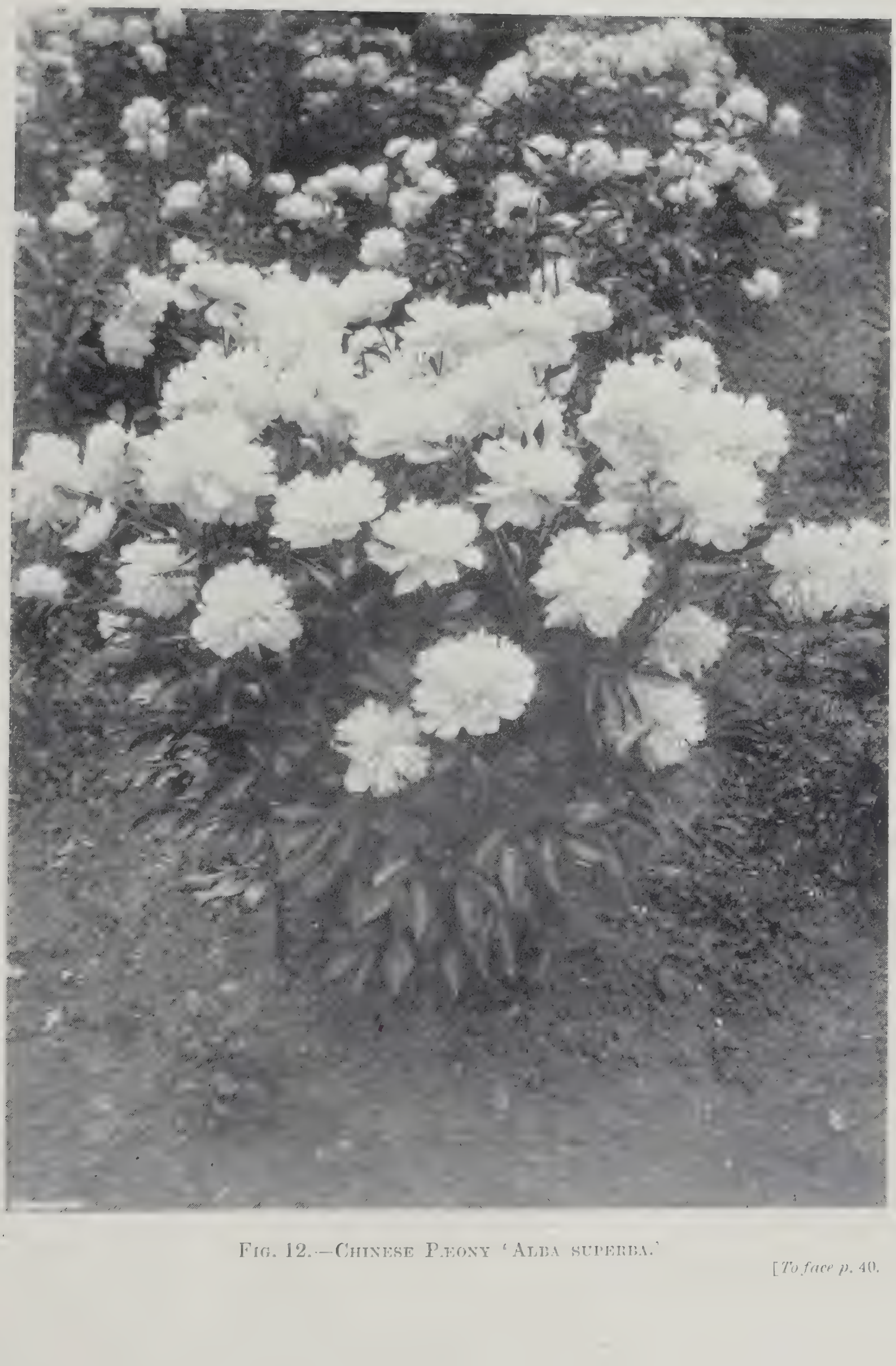


Fig. 12.—Chinese Pæony 'Alba superba.'

[*To face p.* 40.

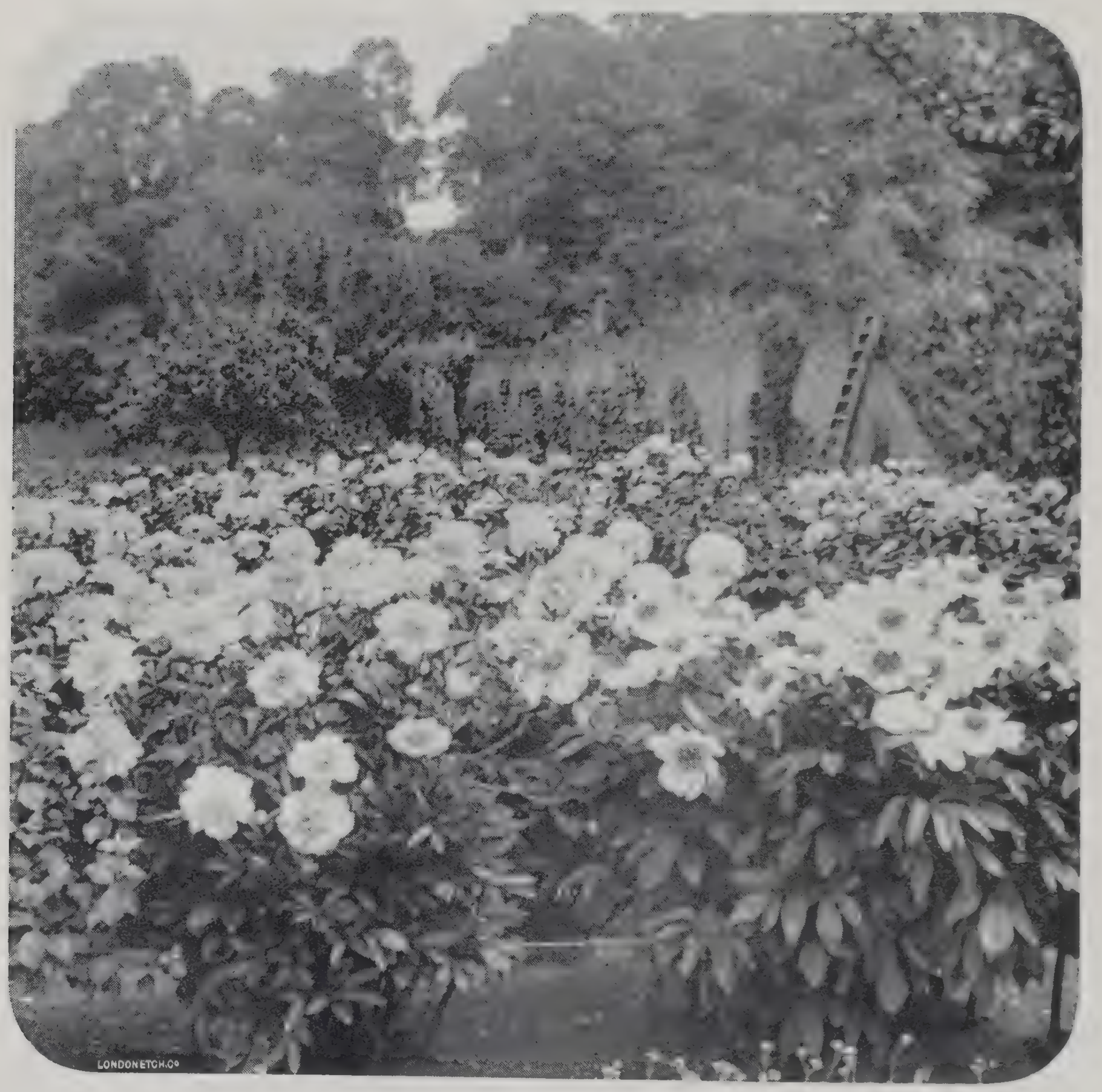


Fig. 13.—Chinese Pæonies at Coombe House, Croydon.

[*To face p.* 41.

REPORT ON THE METEOROLOGICAL OBSERVATIONS MADE AT THE SOCIETY'S GARDEN AT WISLEY IN 1908.

By Mr. R. H. Curtis, F.R. Met. Soc.

The meteorological record at the Society's Garden at Wisley has been maintained without break throughout the year, and that the observers, Messrs. Frazer and Wallis, have taken a keen interest in their work is shown by the careful way in which the record has been kept. The instruments were examined and compared with standard instruments in July, and the station was then found to be in excellent order.

The weather of 1908 was in no respect very exceptional. The temperature was on the whole about the average, there were some warm spells in June and July when several times 80° was exceeded, and again at the close of September and beginning of October when the minimum remained above 60°. Bright sunshine was more abundant than usual over the southern half of England, and rather less than the average elsewhere. Rainfall was about the average in Scotland and Ireland, about 5 per cent. less than average in Wales, 10 per cent. less in North England, and 14 per cent. less over the southern half of England. Gales were not numerous, thunderstorms also were less frequent than usual, but there were some severe snowstorms, the melting of the snow causing floods in some districts.

The observations for each month are as follows:

January.—The weather of the first half of the month was in somewhat marked contrast to that of the latter half, the former being on the whole fair and cold, whilst during the last two weeks it was generally dull, and for the season rather mild, but with an unusual amount of fog. The average temperature for the month was in most places somewhat below the normal, and during the first week some low minima were recorded, the screened thermometer at the Garden falling to 15°·7, which was the lowest point reached until the last day but one of the year. Over the greater part of England the fall of rain was considerably below the average, and in some districts it did not amount to an inch for the entire month. At Wisley the total was just over an inch and an half, but of this amount an inch and a quarter fell on one day (7th), the remainder being distributed over nine other days. In some parts of the kingdom, however, there were very heavy falls, and upwards of an inch fell in twenty-four hours at several places. The winds experienced were pretty evenly distributed round the compass except for the quadrant from east to south, from which they seldom blew. Bright sunshine was generally well above the average, and at some stations in the south of England it amounted to 40 per cent. of the possible amount; at the gardens daily amounts of six hours and upwards were registered on five occasions.

Observations made at Wisley:

Mean temperature of the air in shade	36°·3	
Highest " " "	53°·5	on the 27th
Lowest " " "	15°·7	" 6th
Lowest " on the grass	9°·2	" 4th and 12th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	36°·9	39°·3	41°·9
Highest " " "	41°·7	41°·8	44°·3
Lowest " " "	33°·9	37°·0	40°·7

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 92%

Rain fell on 10 days to the total depth of ... ... 1·55 in.

(Equivalent to about 7¼ gallons of water to the square yard.)

Heaviest fall on any day ... ... 1·26 in. on the 7th

The prevailing winds were from between south and west.

The average velocity of the wind was 7½ miles an hour.

There were 58 hours of bright sunshine, equal to 23 per cent. of the greatest possible amount. There were 13 days on which no sunshine was recorded.

February.—The weather of February was marked by a persistence of westerly winds, which during the latter half of the month frequently attained considerable strength, and were accompanied by a good deal of wet weather. It was, however, warmer than February usually is, but whilst there were no very severe frosts neither were there any very warm days, so that there was but a moderate range of temperature. The coldest period occurred at the close of the second week, when the screened thermometer in the gardens fell to 22°, but at the close of the month a keen cold wind with squalls of rain, and in many places of hail and snow, occasioned a spell of weather which, although not so cold, was perhaps more generally disagreeable. The rainfall was below the average over the southern half of the kingdom, but rather above it in the north. At Wisley the fall, which was spread over fifteen days, only amounted to 0·85 inch, and in many districts it was less than an inch. The distribution of bright sunshine was peculiar, since the largest amounts were recorded over the north-eastern districts and the smallest in the west. At Wisley the total duration was eighty hours, and at many places in the west, which usually have the largest amounts, less than 50 hours were registered, whilst in Northumberland and on the east coast of Scotland the total ranged from 100 to 111 hours.

Observations made at Wisley:

Mean temperature of the air in shade	41°·5	
Highest " " "	53°·8	on the 17th
Lowest " " "	22°·0	" 13th
Lowest " on the grass	21°·4	" 13th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	39°·6	41°·3	42°·2
Highest " " "	43°·1	43°·2	43°·1
Lowest " " "	36°·1	39°·1	41°·2

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 88%

Rain fell on 15 days to the total depth of ... ... 0·85 in.

(Equivalent to about 4 gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·21 in. on the 16th.

The prevailing winds were from south-west and west.

The average velocity of the wind was 8½ miles an hour.

There were 80 hours of bright sunshine, equal to 28 per cent. of the greatest possible amount. There were 4 days on which no sunshine was recorded.

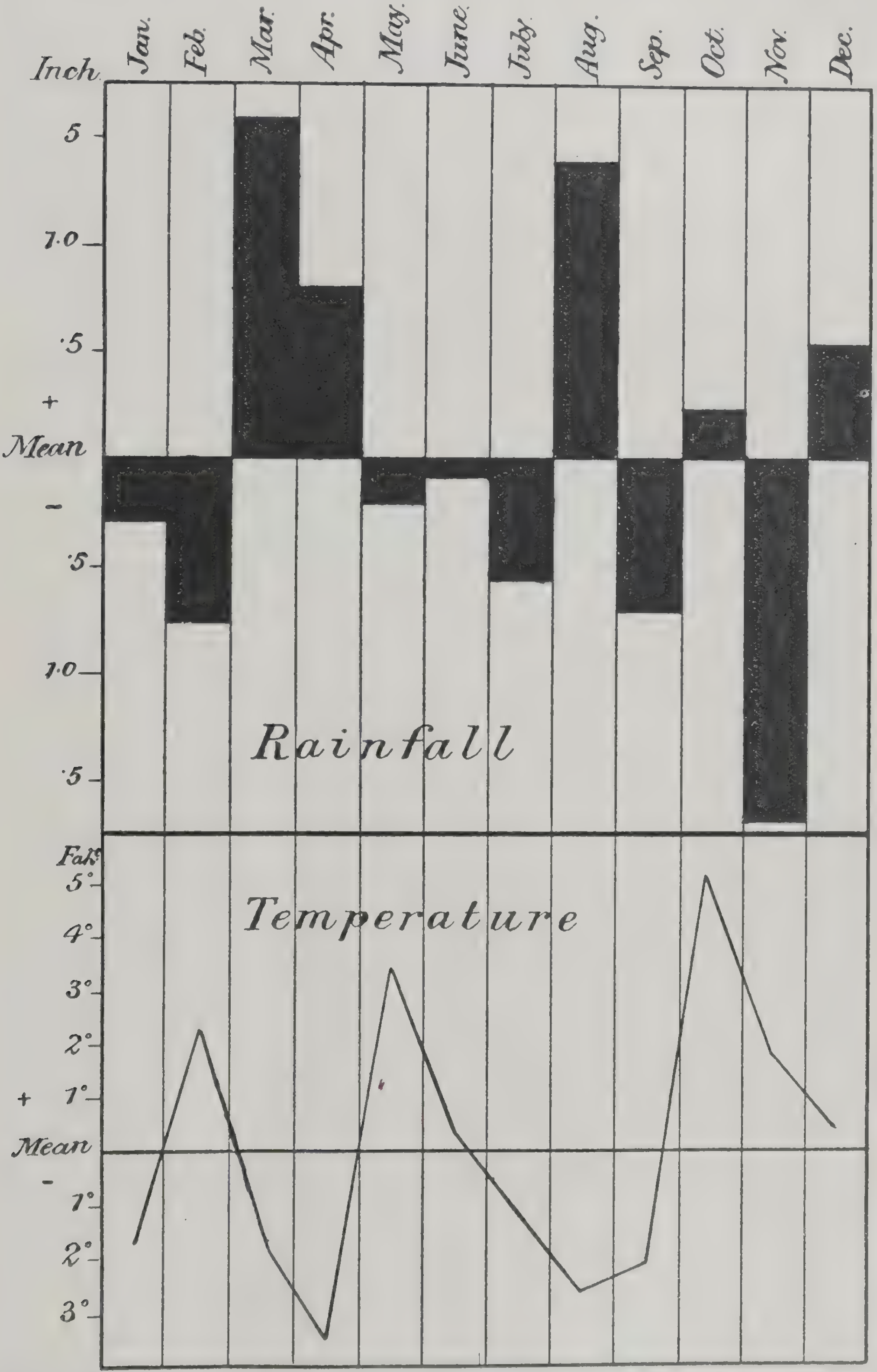


Fig. 14.—Difference of Mean Temperature and of Rainfall for each Month from the Average.

March was a month of continuously unsettled weather, accompanied by winds from nearly every point of the compass, although those from westerly points predominated. The temperature was very generally below the normal, whilst the rainfall was everywhere in excess, and hail and snow were not infrequent. The amount of bright sunshine was with few exceptions less than the average, and the weather of the month may be summed up as cold, wet, and windy, and generally unfavourable for all farm and garden work. Occasionally sharp frosts were experienced, and on the night of the 15th the screened thermometer at Wisley fell to 23°·3, and the thermometer exposed upon the grass to 16°·8, whilst another grass thermometer exposed in a lower part of the garden fell a degree and a half lower. But throughout the month there was an absence of really warm days, the highest temperature reached being only 56°·3 on the 24th, when a westerly wind blew and the sun shone brightly throughout the greater part of the day. It was to this absence of spring-like warmth rather than to the occasional occurrence of somewhat low temperatures that the low average temperature and the general backwardness of vegetation were due, the month being one of the coldest Marchs on record.

Observations made at Wisley:

Mean temperature of the air in shade	40°·2	
Highest ,, ,, ,, ...	56°·3 on the 24th	
Lowest ,, ,, ,, ...	23°·3 ,,	15th
Lowest ,, on the grass	16°·8 ,,	15th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	40°·2	41°·9	42°·4
Highest ,, ,, ,, ...	44°·2	44°·3	43°·3
Lowest ,, ,, ,, ...	37°·6	40°·3	41°·9

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 85%

Rain fell on 20 days to the total depth of ... ... 3·06 in.

(Equivalent to nearly 14½ gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·54 in. on the 5th

The prevailing winds were from between south and north-west.

The average velocity of the wind was 7½ miles an hour.

There were 111 hours of bright sunshine, equal to 30 per cent. of the greatest possible amount. There were but 3 days on which no sunshine was recorded.

April.—The weather of April was in some respects very remarkable, the persistent cold winds from northerly quarters keeping the temperature so low that the month ranks as the coldest April experienced for nearly forty years. The coldest snap was on the 8th and 9th, when the unscreened thermometer at the gardens fell to 17° ; but from the 13th to the 15th, and again from the 18th to the 25th, although the cold was less severe, the thermometer on the grass fell several degrees below the freezing point nearly every night. In some parts of the kingdom, however, the low readings at Wisley were greatly surpassed, a temperature of 4° having been obtained on the ground at Balmoral, 9° at Huddersfield, and less than 15° at many places. During the last ten days of the month there were frequent snowstorms, the worst occurring on the 25th with a severe gale, the snow falling to such a depth that railway traffic became disorganized, road traffic was completely stopped in many districts, and much damage was done to trees and shrubs. The rainfall over the greater part of England and Ireland was above the average, but in

Scotland it was rather below it. Bright sunshine varied from about 100 hours on the eastern coast to rather less than 200 hours in the south-west; at Wisley 145 hours were registered, or 35 per cent. of the greatest amount possible.

Observations made at Wisley:

Mean temperature of the air in shade	44°·0
Highest ,, ,, ,, ...	62°·7 on the 29th
Lowest ,, ,, ,, ...	27°·2 ,, 9th
Lowest ,, on the grass	17°·0 ,, 9th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	43°·8	45°·0	44°·5
Highest ,, ,, ,, ...	49°·4	47°·3	45°·0
Lowest ,, ,, ,, ...	40°·1	43°·4	43°·6

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 78%

Rain fell on 14 days to the total depth of ... ... 2·48 in.
(Equivalent to nearly 11¾ gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·65 in. on the 25th

The prevailing winds were from north and north-east.

The average velocity of the wind was 7½ miles an hour.

There were 145 hours of bright sunshine, equal to 35 per cent. of the greatest possible amount. There were 4 days on which no sunshine was recorded.

May.—A feature of the weather of this month of interest to gardeners was the absence of low night temperatures, the mean of the minimum temperatures being generally a good deal above the average, whilst in many places the lowest point reached by the thermometer was above the lowest which had been observed in May for a good many years past. This was largely due to the cloudiness of the sky, by which the radiation of heat from the ground was greatly checked whilst the temperature of the soil steadily increased, the readings of the thermometer at Wisley one foot below the surface being 16° higher at the end of May than at the beginning of April. The winds also were from southerly and westerly points; and although the amounts of sunshine registered were generally rather under the average the deficit was not large, and in many places between 40 per cent. and 50 per cent. of the possible total was recorded. Thunderstorms with heavy falls of rain or hail were not infrequent, but generally speaking the precipitation was below the average for the month.

Observations made at Wisley:

Mean temperature of the air in shade	55°·9
Highest ,, ,, ,, ...	75°·7 on the 2nd
Lowest ,, ,, ,, ...	36°·5 ,, 24th
Lowest ,, on the grass	30°·0 ,, 11th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	54°·4	53°·5	50°·0
Highest ,, ,, ,, ...	59°·0	57°·3	53°·2
Lowest ,, ,, ,, ...	50°·1	48°·0	45°·3

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 77%

Rain fell on 14 days to the total depth of ... ... 1·74 in.
(Equivalent to about 8¼ gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·29 in. on the 13th

The prevailing winds were from between south and west.
The average velocity of the wind was 7 miles an hour.
There were 192 hours of bright sunshine, equal to 40 per cent. of the greatest possible amount. There were but 3 days on which no sunshine was recorded.

June.—The weather of June was generally fine, with a good deal of sunshine and less rain than the average. A cool northerly wind which was experienced about the 5th and 6th brought the temperature down somewhat, and there was some changeable weather towards the middle of the month, but this was followed by warm summer-like weather which lasted till the close. The amount of rain which fell was in most places less than the average, the amount recorded at Wisley being only 1·72 inches, of which 0·71 inch fell in one day, and it was only on six days that there was any rain to measure. The amount of bright sunshine was generally above the average, and exceeded 280 hours at several places in the south of England. A violent squall, which, however, was of very limited area, was experienced in the Thames valley in the course of the night of the 1st, and did a considerable amount of damage to small trees in Bushey Park and elsewhere; and another of somewhat similar character visited North Herts on the afternoon of the 4th, in thundery weather, and travelled in a S.S.E. direction for about six miles, scattering hayricks, overturning loaded carts, and levelling trees and other obstacles in its path. The temperature of the soil one foot below the surface increased during the month 4½°.

Observations made at Wisley:

Mean temperature of the air in shade	59°·4	
Highest ,, ,, ,, ...	80°·6	on the 4th
Lowest ,, ,, ,, ...	37°·2	,, 7th
Lowest ,, on the grass	29°·1	,, 22nd

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	60°·6	60°·1	56°·3
Highest ,, ,, ,, ...	63°·7	62°·1	58°·0
Lowest ,, ,, ,, ...	58°·4	58°·2	53°·8

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 71%
Rain fell on 6 days to the total depth of ... ... 1·72 in.
(Equivalent to nearly 8¼ gallons of water to the square yard.)
Heaviest fall on any day ... ... 0·71 in. on the 1st
The prevailing winds were from north-east and north.
The average velocity of the wind was 5 miles an hour.
There were 266 hours of bright sunshine, equal to 55 per cent. of the greatest possible amount. There were no entirely sunless days.

July.—The fine weather with which June closed continued during the opening days of July and produced some high readings of the thermometer over all the central parts of England and even in many parts of Scotland. After the first few days, however, a change took place to unsettled weather, a good many small depressions passing across the country bringing with them rain, which in some districts was very heavy and lowered the temperature considerably. The wet weather ceased about the 18th, and from that day to the close of the month no rain fell at Wisley. The fall of rain was, however, patchy, some districts having much less than the average, whilst others, as for example the north-west of England, had considerably more. Winds blew chiefly from westerly points and at times rather strongly, and there were several thunderstorms. Bright sunshine was plentiful over southern England, but at some places in the north it was very deficient, not amounting to 20 per cent. of the possible amount. At Wisley 41 per cent. of the possible amount was recorded, there having been no day on which some record was not obtained.

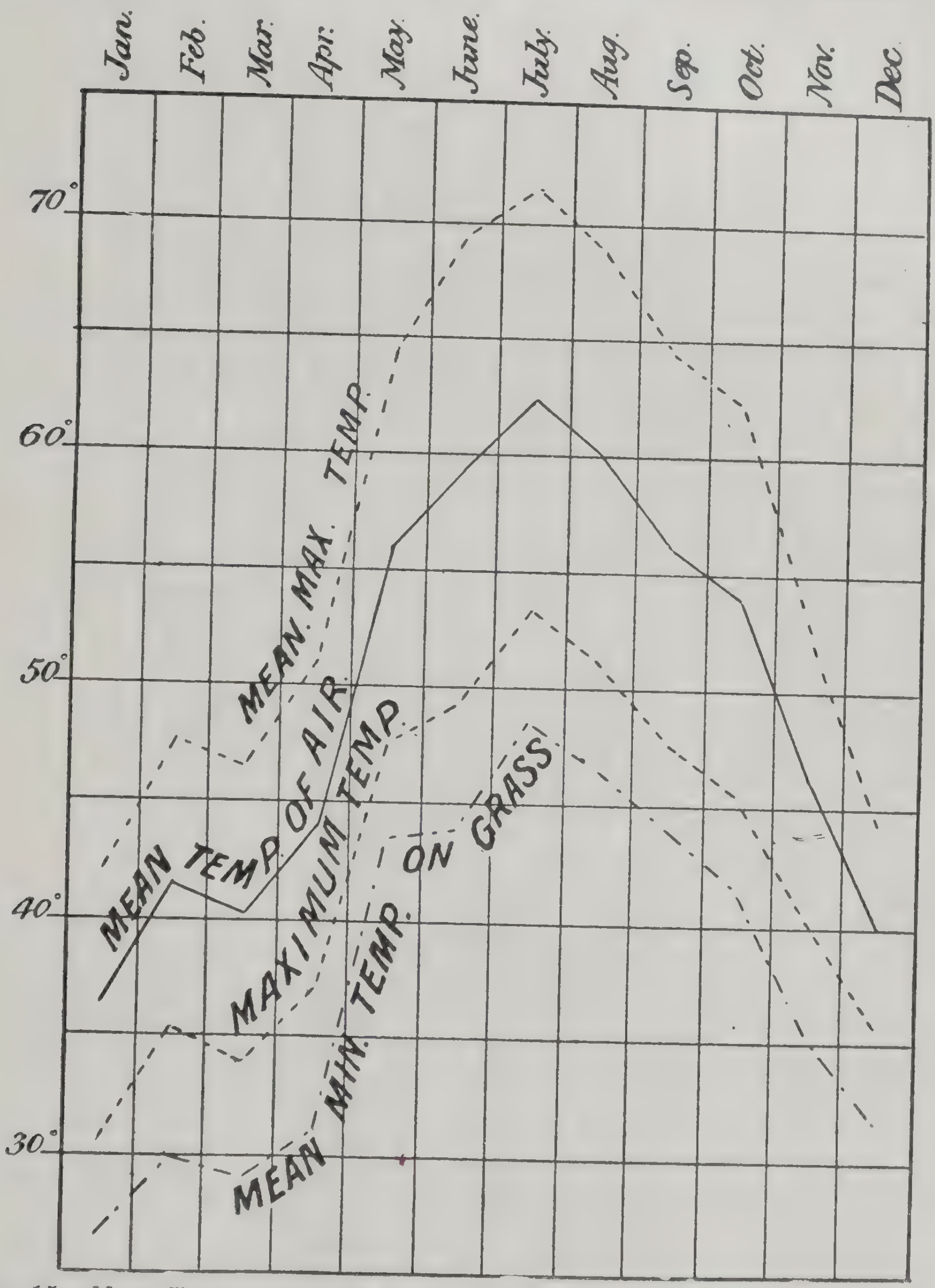


Fig. 15.—Mean Temperature of the Air; Maximum and Minimum Temperatures of the Air; and Minimum Temperature on the Grass, for each Month.

Observations made at Wisley :

Mean temperature of the air in shade	62°·2	
Highest ,, ,, ,, ...	82°·6 on the	3rd
Lowest ,, ,, ,, ...	47°·0 ,,	30th
Lowest ,, on the grass	38°·7 ,,	3rd

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	62°·8	62°·5	59°·3
Highest „ „ „	65°·6	64°·2	60°·6
Lowest „ „ „	58°·9	60°·1	58°·1

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 75%

Rain fell on 11 days to the total depth of ... ... 1·85 in.

(Equivalent to about 8½ gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·59 in. on the 16th

The prevailing winds were from south-west and west.

The average velocity of the wind was 5 miles an hour.

There were 202 hours of bright sunshine, equal to 41 per cent. of the greatest possible amount. There were no entirely sunless days.

August.—The winds throughout a great part of this month were from west, north-west or north, and consequently cool, so that there was an entire absence of very hot days, although the weather was generally fine and dry. The nights were warm, except for a short interval in the middle of the month, when the grass thermometer fell to 35° at Wisley, and to below the freezing point at several places further north. After the third week the character of the weather entirely changed and a succession of disturbances passing across the kingdom brought with them unsettled, showery weather, and in some parts heavy rain. On the whole the month was a sunny one, Wisley having very nearly 50 per cent. of the possible amount, and many places on the south coast having upwards of 60 per cent. The frequency of rain varied a good deal in different localities, but whilst the fall was deficient over the northern half of the kingdom and in Ireland, it exceeded the average over the southern counties.

Observations made at Wisley:

Mean temperature of the air in shade	59°·9	
Highest „ „ „	81°·2 on the	3rd
Lowest „ „ „	41°·0 „	17th
Lowest „ on the grass	35°·0 „	17th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	61°·8	62°·5	60°·7
Highest „ „ „	66°·6	64°·7	61°·6
Lowest „ „ „	57°·7	60°·0	59°·5

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 74%

Rain fell on 14 days to the total depth of ... ... 3·18 in.

(Equivalent to about 15 gallons of water to the square yard.)

Heaviest fall on any day ... ... 1·04 in. on the 23rd

The prevailing winds were from between south-west and north.

The average velocity of the wind was 6 miles an hour.

There were 215 hours of bright sunshine, equal to 48 per cent. of the greatest possible amount. There were but 2 days on which no sunshine was recorded.

September.—Generally speaking, the weather was unsettled and changeable all through the month, the temperature varying considerably, but being on the whole lower than the average until the close of the month, when a spell of warm summer-like weather set in. At the beginning of the month, with a cool northerly wind, the thermometer very generally failed to reach 55°, whilst at its close it rose to 77° at Wisley, that being the highest reading recorded there for the month, and to upwards of 80° in some parts of the kingdom. In some places there were sharp ground-frosts also at the opening of the month, chiefly in the north and over central England, but at Wisley 32° was reached only on the night of the 12th. In Berkshire a heavy storm of rain, hail and snow was experienced on the 11th, and at Canterbury a deluge of hail and rain accompanied a thunderstorm on the same day. The rainfall was considerably more than the average in the north but was much below it in the south of England; the total fall at the Garden was 1·29 inches, whilst on the Essex coast it did not exceed an inch. Bright sunshine was deficient over the north but slightly in excess of the average on the south coast, and at Wisley it amounted to 41 per cent. of the possible amount.

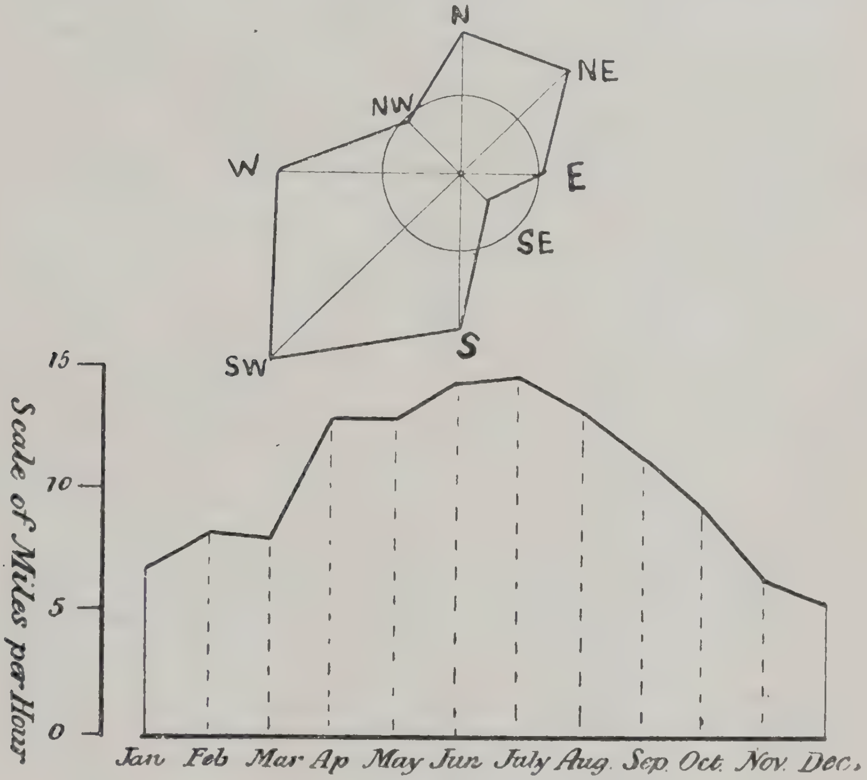


Fig. 16.

Upper diagram shows the annual distribution of winds round the compass. The prevalence of calms is indicated on the same scale by the diameter of the circle.

Lower diagram shows the mean velocity of the wind for each month of the year.

Observations made at Wisley:

Mean temperature of the air in shade	56°·0		
Highest „ „ „	77°·2 on the 30th		
Lowest „ „ „	36°·3	„	13th
Lowest „ on the grass	32°·3	„	13th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	56°·3	57°·6	57°·4
Highest „ „ „	59°·7	59°·3	59°·3
Lowest „ „ „	53°·7	56°·3	56°·6

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 81%

Rain fell on 13 days to the total depth of	1·29 in.
(Equivalent to about 6 gallons of water to the square yard.)	
Heaviest fall on any day	0·44 in. on the 3rd

The prevailing winds were from between south and west.

The average velocity of the wind was 5 miles an hour.

There were 153 hours of bright sunshine, equal to 41 per cent. of the greatest possible amount. There were only 2 days on which no sunshine was recorded.

October.—The remarkably warm weather with which September came to a close continued on into October, and the month was one of unusual mildness. During the first four days the thermometer rose to quite an exceptional height, the maximum readings being the highest recorded in October for nearly half a century. At the Garden 77° was the maximum, but at some stations in England 80° was exceeded, and a reading of 78° was recorded so far north as Banffshire. The third week, although not cold for the time of the year, was the coolest period of the month, and ground frosts occurred two or three times, but as the month drew to a close the thermometer rose again, and on the 29th a shade reading within 2° of 70° was obtained at Wisley. On the whole the month was the warmest October experienced for many years. The temperature of the soil kept high, as might have been expected from what has been already said, and the mean at one foot below the surface was only 2° below the mean for September. The fall of rain was generally below the average, and at many places a large part of the total fall fell in one day; at Wisley nearly half of the monthly amount fell on the 18th, and at many places in the south and south-west of England large falls of more than two inches were recorded at about the same date; at Weymouth four inches fell in about five hours. The winds were mostly from southerly points, and the amounts of "bright" sunshine registered were generally above the normal, the percentage of the possible sunshine amounting to nearly 50 per cent. at many places.

Observations made at Wisley:

Mean temperature of the air in shade	53°·8
Highest " " "	77°·0 on the 2nd
Lowest " " "	31°·4 " 25th
Lowest " on the grass	26°·2 " 25th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	54°·3	55°·9	56°·3
Highest " " "	59°·3	59°·4	58°·0
Lowest " " "	46°·0	50°·3	52°·9

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100)	94%
Rain fell on 9 days to the total depth of	2·53 in.
(Equivalent to nearly 12 gallons of water to the square yard.)	
Heaviest fall on any day	1·22 in. on the 18th

The prevailing winds were from between north and south-east.

The average velocity of the wind was $3\frac{1}{2}$ miles an hour.

There were 113 hours of bright sunshine, equal to 35 per cent. of the greatest possible amount. There were 6 days on which no sunshine was recorded.

November.—The most noticeable feature of November was the mildness of the weather throughout the month, and although as a rule the temperature was not remarkably high, yet readings of 60° and upwards were recorded at many widely separated places, generally at the commencement of the month. At the close of the first week there was a short spell of colder weather, the thermometer falling to below 20° at Wisley, and sharp night frosts being experienced generally from the 8th to the 11th. On the grass the temperature fell still lower, 16°·5 being the lowest point reached at Wisley, whilst at Greenwich it dropped to 9° and in Mid-Wales to 7°. Taking the month as a whole it was the warmest November experienced for several years. Winds from the south-westerly quadrant predominated, but over the southern part of the kingdom it frequently blew from northerly and easterly points. The amounts of sunshine recorded were as a rule above the average, and varied from about 40 per cent. of the possible amount in the Channel Islands to only 8 per cent. in the Shetlands; at the Garden it amounted to 29 per cent. Rainfall was below the average except in the northern parts of the kingdom, and the number of days on which rain fell was generally small. Over the greater part of the Midlands the fall amounted to less than an inch, and to less than two inches over the eastern half of the kingdom from the Channel to the Moray Firth.

Observations made at Wisley:

Mean temperature of the air in shade	46°·2	
Highest ,, ,, ,, ...	60°·9 on the	1st
Lowest ,, ,, ,, ...	19°·8 ,,	10th
Lowest ,, on the grass	16°·5 ,,	10th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	46°·5	48°·6	50°·7
Highest ,, ,, ,, ...	51°·9	52°·8	53°·2
Lowest ,, ,, ,, ...	40°·6	41°·6	49°·1

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 90%

Rain fell on 11 days to the total depth of ... ... 0·67 in.

(Equivalent to about 3 gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·28 in. on the 21st

The prevailing winds were from between south and west.

The average velocity of the wind was 5½ miles an hour.

There were 76 hours of bright sunshine, equal to 29 per cent. of the greatest possible amount. There were 8 days on which no sunshine was recorded.

December.—The weather of December was in no way remarkable until the last week of the month. The temperature was rather above the average, and night frosts were rare and nowhere severe. The winds blew almost constantly from the south-westerly quadrant, and were not only mild but also of moderate strength, and although rain fell frequently there were no very heavy falls. At Christmas time, however, a change set in; the wind shifted to the north-east, and a current of cold polar air swept across England, bringing with it severe wintry weather, and in many parts deep snow. A screen temperature of 1° was registered at Liphook, and at Wisley a reading of 7°·5, whilst on the ground the grass minimum thermometer fell to zero at Wisley, and to 8° below zero at Epsom. At many places the snow buried the thermometer and rendered its record useless. In Scotland the cold was less severe, and in Ireland it was scarcely felt, as was also the case in western Cornwall. The cold spell was, however, of brief duration, and on the 30th a milder air set in. The fall of rain was rather in excess of the average in most districts, although at many places on the eastern littoral it still came to less than an inch. The amount of bright sunshine was small even for December, the largest records being only about 20 per cent. of the possible amount, and at Wisley only 14 per cent.

Observations made at Wisley :

Mean temperature of the air in shade	39°·9	
Highest " " "	54°·3	on the 13th
Lowest " " "	7°·5	" 30th
Lowest " on the grass	0°·0	" 30th

	At 1 ft. deep.	At 2 ft. deep.	At 4 ft. deep.
Mean temperature of the soil at 9 a.m.	42°·8	45°·3	47°·5
Highest " " "	47°·2	48°·2	49°·1
Lowest " " "	35°·9	40°·2	44°·8

Mean relative humidity of the air at 9 a.m. (complete saturation being represented by 100) 94%

Rain fell on 17 days to the total depth of ... ... 2·23 in.

(Equivalent to about 10¼ gallons of water to the square yard.)

Heaviest fall on any day ... ... 0·36 in. on the 14th and 29th

The prevailing winds were southerly and easterly.

The average velocity of the wind was 6 miles an hour.

There were only 33 hours of bright sunshine, equal to 14 per cent. of the greatest possible amount. There were 18 days on which no sunshine was recorded.

NOTES ON SOME HYBRID TUBEROUS SOLANUMS.

By Rev. J. Aikman Paton, M.A., B.Sc.

In the summer of 1907, among other crosses, I effected two on *S. Maglia*, the white-flowered Chilian wild potato. Twenty-five berries were formed and grew (pollen of several different varieties, wild and cultivated, being used), but of these only two were found to contain sufficiently matured seed—one seed in each berry. The pollen parents were (1) *S.* "*etuberosum*" (so-called),* and (2) a Chilian cultivated variety (*Francesa Col.*). The two resulting seedlings showed a marked difference from the beginning, the former being much more vigorous.

(1) *S. Maglia* × *S.* "*etuberosum*": sown March 28, 1908; first flower July 1, first berry July 6 (thirty-one berries altogether); taken up December 7; tubers white [*a*].

This seedling, a very strong one, resembles *S.* "*etuberosum*" in having a green stem and soft foliage, but the leaflets are much larger, like those of the cultivated sorts, from which, indeed, they cannot be distinguished. (The foliage of the parents is quite distinct, and in each case distinct from that of the cultivated forms.) The plant has the branching habit of *S. Maglia* fully developed, almost every node for a good way up the stem producing a branch. The leaves seem immune from attack by the fungus *Phytophthora infestans*. The corolla is large, measuring about two inches from tip to tip—very much larger than that of either parent—mid-violet in colour, with white tips. (*S. Maglia* has pure white flowers, *S.* "*etuberosum*" pale lavender (No. 207, 1),† with violet tinge on back rays.) The trusses are very large and abundant. The stamens are large and finely formed, straight (those of *S. Maglia* are usually curved inwards) like those of *S.* "*etuberosum*," but much larger, and full of fertile pollen. The style very slightly projects beyond the stamens. Thirty-one berries have formed on the plant, all due to artificial pollination. The berries are unlike those of either parent, being large, round, of a beautiful green colour (No. 243, 4, shading to No. 271, 2 and 1),† without spots, quite like the common potato berries. (*S. Maglia* has laterally compressed round berries; *S.* "*etuberosum*" has ellipsoidal white-spotted berries, and in both they are much smaller than those of the hybrid. The tubers are in *colour* quite white (those of *S. Maglia* are violet (No. 191),† those of *S.* "*etuberosum*" brownish-yellow-white), but of the same *shape* (although this varies greatly) as those of *S. Maglia*. They occur at the ends of short runners, as in some cultivated forms.

I have effected a number of crosses with the pollen of this hybrid on cultivated varieties, *e.g.* 'Jeanie Deans,' 'Duchess of Cornwall,' 'Eldorado,' 'Ninetyfold,' 'Peacemaker,' &c., showing that it is quite fertile. The seeds produced as a result of these crosses have been sown.

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* Its "selfed" seedlings seem to show that this is a hybrid. (See note p. 56.)

† These numbers refer to the colour numbers in the *Répertoire des Couleurs*.

(2) *S. Maglia* × a Chilian cultivated variety (*Francesa Col.*): sown March 28; first flower opened August 3; taken up November 11 [3].

This seedling entirely resembles *S. Maglia* in general appearance, and would at first sight be taken for that plant. It has dark branching stems and sparse, firm foliage, which is subject to disease about equally with *S. Maglia.* The flowers are scanty, the trusses small. The corolla is large, of mid-violet colour, with white tips (very like that of No. (1) seedling in size and colour)—one truss had pure-white flowers—the stamens strong, and straight, similar to those of No. (1), but not having so much or so fertile pollen; the style is longer, projecting beyond the stamens like that of *S. Maglia.* This plant had no berries, although every flower was pollinated. The tubers are in colour violet (No. 191, 1 and 2), like those of *S. Maglia*, of good shape, rounded oblong, smaller at the "rose" end than at the base, with white eyes. They were all found near the top of the soil in the pot, and are entirely free from disease, although the leaves were affected.

It is difficult to get seed from *S. Maglia.* Again this summer, although on one of my plants fifty-five berries set and swelled (due to many different crosses) only five of them have contained mature seed—one seed in each.

In 1907 I also effected a cross of *S.* "*etuberosum*" × 'Duchess of Cornwall,' and append brief notes of the fourteen seedlings resulting. The two dates at each are those of flowering (first flower open) and of taking up. They were all sown on March 19, 1908:—

1. July 15, September 15: White flower, would not "self"; fifty tubers, same as those of *S.* "*etuberosum,*" three slightly diseased; 19¾ oz.

2. July 16, October 31: Flower almost white, dark lavender rays at back, downy; sepals greenish, downy; tips green; three tubers, small, round, violet-black.

3. July 18, November 10: Flower pale mauve; back of petals rich mauve, rays hirsute; sepals brownish, hairy, tips brown; eleven tubers, red (No. 170, 3; or 105, 4); deep eyes.

4. July 19, September 28: Flower lavender; back of petals mid-violet; large anthers; little pollen; sixteen tubers, round, white, five slightly diseased; deep eyes; coarse. Very strong plant.

5. July 30, September 28: Flower uniform mauve; small truss; nine tubers (besides five largest diseased), round, oblong, white; fine; second growth started, one bud half inch long. (Too long in ground.)

6. August 1, September 28: Flower white, tinged creamy-pink; six tubers, oblong, white, small at end of runners; foliage diseased, September 18.

7. August 3, November 23: Flower not noted; very strong plant: 102 tubers, white, good size, many of good form, round; large lenticels.

8. August 4, not noted: Flower pale carmine-mauve; eleven tubers, fine, kidney form, white, flesh yellowish, two diseased.

9. August 5, September 23: Flower nearly as *S.* "*etuberosum,*" very pale mauve at centre, rest nearly white; pollen abundant; one small coloured tuber forming; foliage destroyed by disease September 15.

10. Not noted, September 28: Sixteen tubers, white, round, fine, an

improved "*etuberosum*"; second largest tuber diseased, several pushing November 24. (Too long in ground.)

11. Not noted, September 14: Eighteen tubers, white, round, early, no disease; yellow flesh, very fine; two pushing November 24.

12. Not noted, September 15: Poor plant; roots all gone; five tubers.

13. Not noted, September 23: Eight tubers, white with violet tint; good.

14. No note made.

Another cross of *S.* "*etuberosum*" × Chilian variety gave twenty-two seedlings, some noteworthy.

I may mention the remarkable fact that a seedling plant of *S.* "*etuberosum*" "selfed" produced 481 tubers (probably 500, as some were lost), weighing over 3 lb., white, with no trace of disease. The flower of this plant is white tinged with violet, the back of the petals being pale violet with white edges; the plant very strong, foliage also showing no disease. [A cross of this with [α] has given two good berries.] These selfed seedlings were planted out too late for the tubers to attain their proper size, but I have never known a *cultivated* seedling to produce so many tubers, although I have raised upwards of 13,000.

NOTE ON "SOLANUM ETUBEROSUM."

By The Editor.

In 1835 Dr. John Lindley, F.R.S., F.R.H.S., figured and described in the "Botanical Register," t. 1712, under the name of *Solanum etuberosum*, a species of *Solanum* which had been introduced from Chile by the Royal Horticultural Society some years before. He describes the plant as a hardy perennial and states that "it bears rich clusters of deep purple blossoms, with a golden yellow centre, from July to October, and is very easily multiplied by dividing its stout rooting underground stems."

"Although extremely similar to the Potatoe (*sic*) in appearance, yet its larger and more compact flowers and its want of power of producing tubers renders it a proper plant for the flower garden."

"There can be no doubt that this is a species essentially distinct from the Potatoe, and yet it is impossible to point out any character by which it is to be positively distinguished, except the want of tubers and the smoothness of the calyx and flower stalks; these latter have a shining and nearly downless surface, instead of the rough dull appearance which we meet in those parts in the common Potatoe."

Dr. Lindley also emphasizes the absence of tubers and the smoothness of the calyx in a note to his technical diagnosis: "Facies omnino *S. tuberosi*, sed tubera nulla profert; flores majores sunt, brevius pedunculati, calyxque glaber est et lucidus, nec pilis hispidus. Species certo certius distinctissima, etsi notis levibus cognoscenda."

Mr. Paton considers that the plant which he has called *S. etuberosum* in his "Notes" (p. 53) is possibly a hybrid, since when it is self-fertilized its seedlings show marked variability.

Mr. A. Sutton, F.L.S., V.M.H., has included in his important studies of various wild forms and species of tuber-bearing Solanums * a plant under the same name, which is apparently identical with the one Mr. Paton has employed. He also finds that, when self-fertilized, the seedlings of this plant vary to the same extraordinary degree, as is seen in the seedlings of the potato of commerce. This trait in the character of the plant, in which it differs from all the other wild forms cultivated by Mr. Sutton, has led him to believe that this "may probably be the parent form of the cultivated potato of to-day."

Mr. Sutton says, "The examples of *Solanum etuberosum* which I possess came originally from the Botanic Gardens, Edinburgh, in March 1887, through Mr. Lindsay, and again from the same stock in 1897 from Dr. Bayley Balfour. They produced at first small tubers about the size of walnuts, and the calyces are hispid; in other respects the plants are similar to the type specimen described by Lindley." †

The original source of the plant in the Edinburgh Botanic Gardens is not known, but it is thought to have been introduced from a wild source. Some years ago we had tubers from Edinburgh, through the courtesy of Mr. Lindsay, F.R.H.S.; and, as in many other gardens, we found the plant to be quite hardy, but, as Mr. Sutton observes, to produce tubers abundantly (and under garden cultivation much larger than walnuts) and to have a hispid calyx: characters—which are well shown in the excellent plate * which adorns Mr. Sutton's paper.

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* See *Journ. R.H.S.* vol. xxxiii. pp. xxviii. and xxxvi., and vol. xxxiv. p. xxviii.; also *Journ. Linn. Soc.* vol. xxxviii p. 446.

† *Journ. Linn. Soc.* xxxviii. p. 449.

Thus, in the two characters upon which Dr. Lindley relied to separate his species from *S. tuberosum* the present plant is like *S. tuberosum*. It would therefore appear that this plant is not specifically identical with the one Dr. Lindley described, though with which, if with either, of the described species it should be included appears doubtful. Lindley's plant is probably lost to cultivation, but the type specimen is in the Lindley herbarium at Cambridge.

Mr. W. G. Baker † considers Lindley's plant "likely to be a variety of *tuberosum*" and notes there is a wild specimen, labelled with the same name in Mr. Reed's Chilian herbarium, which differs from the "type *by its more hairy leaves and calyx and more pointed calyx teeth*."

The Edinburgh plant, except in the characters mentioned above, agrees well with the description of Dr. Lindley's plant and in addition differs from *S. tuberosum* by the fruit, which is globose, having small whitish warts upon its surface. [Whether this is always the case is doubtful, since Mr. Sutton ‡ figures a smaller berry without warts.] In addition Mr. Sutton observes that the pollen of *S. etuberosum* is always elliptical (a character which Mr. Paton does not confirm), and as this character is common to the undoubtedly wild forms of tuberous Solanums he concludes that in this plant we have to deal with a true wild species. The varieties of the cultivated potato produce pollen which varies in shape.

Perhaps the greatest interest attaching to the plant lies in the fact that both Mr. Sutton and Mr. Paton have found it, though growing among cultivated potatos attacked by the dreaded *Phytophthora infestans*, to remain persistently free from the disease induced by that fungus; an observation that we are able to confirm. Since Professor Biffen has shown that, at least in wheat, disease resistance may be an hereditary character, it is to be hoped that by using this form as one of the parents (or grandparents) we may obtain a potato at last which will resist the attacks of the fungus which causes more loss every year to potato growers than any other.

* *l.c.* t. 46.

† "Tuber-bearing Solanums," *Journ. Linn. Soc.* 1884, p. 489.

‡ *l.c.* pl. 46.

ANEMONE VARIATA [*A. FULGENS* × *STELLATA*].

By Mr. A. Worsley, F.R.H.S.

Many years ago many varieties of Anemone intermediate between *Anemone fulgens* and *A. stellata* were noticed in the gardens of the French Riviera. In this district *A. fulgens* was then only to be found in gardens; it is admittedly a good species and reproduces itself fairly true from seed. On the other hand, *A. stellata* was to be found growing wild, especially about Cap Martin; yet this wild anemone is so inconstant in its characters, and so variable in its seed-progeny, that we are compelled to class it rather as a group of varietal forms than as a species in the generally accepted meaning of this word.

A few years ago Messrs. Vilmorin, Andrieux & Co., of Paris, put into commerce an alleged hybrid between these species, which, as I understand, they had themselves obtained from a private garden. This is the plant of which I am now treating. Quite recently the same hybrid appears to have arisen spontaneously in the garden of Messrs. van Tubergen, Jun., of Haarlem. In the latter instance the seed parent was a fine form of the species known in gardens as *A. fulgens annulata grandiflora*, and grew in a collection, amongst which were forms of *A. stellata*. As a result of sowing the seed of the former there arose an intermediate race differing in no other respect from the hybrid of Messrs. Vilmorin, excepting that it possesses a wider range of colour. This is not at all to be wondered at when we reflect that *A. fulgens annulata* is a bicolored form of *A. fulgens*.

Now although there is no direct evidence that any particular persons pollinated one species with the other, yet we have the evidence that an intermediate race springs up between these species when they are grown in juxtaposition, and that the origination of this intermediate race has been observed on three different occasions by credible witnesses. I will now show that the alleged hybrid hold a position equipoised between its alleged parents; beyond this no further evidence can be adduced until an analysis can be made of the subsequent generations springing from the self-fertilized hybrid plants—providing the same are not sterile.

On comparing the alleged parents we note only three characters in which they differ *inter se*, and in only one of these is this divergence very wide. They are as follows:—

A.	Foliage in male, slightly taller	Hybrid takes after male.
a	„ „ female, „ shorter	
B.	Sepals „ male, number 10 to 12	„ „ „ female.
b.	„ „ female, „ 12 or more	
C.	Colour in male, white to purple or rosy	„ „ intermediate.
c.	„ „ female, intense scarlet	

The formula would therefore be $Ab\,\frac{Cc}{2}$ in the individuals I have observed. But I would note that the only divergent character upon which we should place great importance is in the colour of the sepals. In this one respect there is no doubt that *A. variata* holds an intermediate position; but the doubt may certainly arise whether two forms of the genus which only differ markedly from each other in the one respect of colour should not be included in one species. On the other hand, as garden plants, *A. fulgens* and *A. stellata* are sufficiently distinct, the former being noticeable for the regularity of its intensely coloured sepals, and the latter for the comparative irregularity of its palish sepals and for its richness in albinos and albinoids.

The alleged hybrid is generally of an intense purple, and varies between a crimson-purple and a brilliant old-rose colour. Up to the present time I have not seen any other shades of colour.

COMMONPLACE NOTES.

By the Secretary, Superintendent, and Editor.

Statistics of Interest to British Horticulturists.

The following statistics, abstracted from the Government Trade and Navigation Returns for 1908, are in continuation of those appearing in volume xxxiv, pages 97–98, of the R.H.S. Journal :—

TABLE I.—SHOWING THE IMPORTS OF FRUIT AND VEGETABLES DURING 1906–8.

—	Quantities			Values		
	1906	1907	1908	1906	1907	1908
Fruit :				£	£	£
Apples, raw (cwts.)	2,808,732	3,526,232	3,376,579	1,753,577	2,231,327	2,079,703
Apricots and Peaches ,,	7,646	38,814	30,620	17,967	78,583	60,141
Bananas, raw (bunches)	6,425,704	6,232,158	6,385,449	1,903,639	1,771,095	1,769,249
Cherries, raw (cwts.)	191,106	165,412	160,479	245,906	199,489	235,523
Currants, raw ,,	106,718	109,130	102,110	139,773	142,245	121,852
Gooseberries, raw ,,	39,374	45,603	44,518	22,921	25,994	25,529
Grapes, raw ,,	690,371	798,377	673,673	667,969	769,307	728,026
Lemons ,,	849,935	882,193	1,045,009	440,406	421,599	471,713
Nuts : Almonds ,,	126,296	161,947	148,839	529,164	660,604	560,301
,, other nuts, used as fruit ,,	727,260	702,598	752,179	683,418	749,538	768,560
Oranges ,,	5,230,991	6,120,185	5,663,841	2,183,411	2,454,569	2,269,651
Pears, raw ,,	576,573	500,132	523,029	572,274	478,611	515,914
Plums, raw ,,	891,113	325,761	402,881	758,720	345,720	428,966
Strawberries, raw ,,	52,164	44,178	33,391	64,777	54,186	45,791
Unenumerated, raw ,,	504,345	538,465	436,947	388,598	339,462	291,325
Fruit, Dried :						
Currants ,,	1,458,159	1,188,481	1,298,996	1,648,410	1,392,271	1,447,862
Raisins ,,	584,956	708,053	763,013	1,106,889	1,209,576	1,207,902
Vegetables, Raw :						
Onions (bushels)	8,310,534	8,645,048	7,896,108	953,615	1,036,231	993,669
Potatos From Germany (cwts.)	137,396	785,647	643,459	23,508	145,786	122,260
,, France ,,	1,659,868	2,997,389	3,146,650	536,449	853,075	724,873
,, Channel Islands ,,	1,170,372	1,947,237	1,206,607	501,695	742,610	564,172
,, Other countries ,,	852,151	2,519,093	2,041,607	270,375	630,074	558,911
Total	3,819,787	8,249,366	7,038,323	1,332,027	2,371,545	1,970,216
Tomatos (cwts.)	1,124,700	1,135,499	1,160,283	953,475	1,020,805	955,985
Unenumerated	171,106	183,821	191,469	404,928	365,230	371,209
Flowers, Fresh value £	—	—	—	233,884	233,641	229,802

It will be seen from the above that, excepting Bananas, Lemons, Nuts, Pears, and Plums, the imports of fruits in 1908, were considerably less than during the preceding year ; and if compared with 1906, again a lessening occurs with five exceptions including Apples, Oranges, and Gooseberries. This reduction has, in almost every case, a corresponding lower gross value, though for Grapes, an import short of 1906 by 16,698 cwt. has an assessed value of £60,057 in excess of 1906 in a gross value of £728,026—a somewhat striking fluctuation. The imports of Apples have remained fairly stationary since 1904, though in 1903 4,569,546 cwt. were received.

TABLE II.—SHOWING THE EXPORTS OF FRUIT &c., 1906–1908

—	Quantities			Values		
	1906	1907	1908	1906	1907	1908
FRUIT:				£	£	£
Lemons . . . . (cwts.)	20,607	27,612	20,457	11,787	14,544	9,915
Oranges . . . . ,,	291,206	340,294	248,421	127,597	136,475	100,735
FRUIT, DRIED:						
Currants . . . . . ,,	40,901	21,829	22,128	48,379	31,328	27,012
Raisins . . . . . ,,	29,650	42,101	14,667	46,205	69,977	26,824
Jams, preserved fruits, and confectionery . . . . (cwts.)	425,603	429,742	424,025	1,037,572	1,081,544	1,089,521
Pickles and vegetables preserved in salt or vinegar . . (galls.)	707,723	794,762	670,773	120,588	68,433	139,862
Provisions, unenumerated (cwts.)	—	—	—	658,539	590,000	584,292

TABLE III.—SHOWING THE IMPORTS OF WOOD AND TIMBER DURING 1906–1908.

—	Quantities			Values		
	1906	1907	1908	1906	1907	1908
WOOD AND TIMBER:				£	£	£
Hewn: Fir, Oak, Teak, &c. (other than Pit props or Pit wood) . . . . (loads)	795,062	885,011	841,885	3,698,238	3,939,936	3,304,729
Hewn: Pit props or Pit wood ,,	2,451,669	2,627,209	3,041,440	2,713,005	3,049,484	3,579,355
	3,246,731	3,512,220	3,883,325	6,411,243	6,989,420	6,884,084
Sawn or split, plane or dressed . . . . ,,	6,692,260	5,985,588	5,488,447	18,534,958	17,146,823	14,515,433
Stakes of all dimensions . ,,	139,041	171,721	147,028	632,568	736,422	682,105
Furniture woods, Hardwoods and Veneers;						
Mahogany . . . (tons)	84,048	104,112	119,481	722,835	893,288	1,012,957
Other sorts . . . ,,	195,176	199,953	189,662	1,205.806	1,327,101	1,211,480
Total of Wood and Timber . .	—	—	—	27,507,410	27,093,054	24,306,059
MANUFACTURES OF WOOD AND TIMBER:						
Furniture and Cabinet ware . .	—	—	—	612,502	565,429	447,904
House frames, fittings, and joiners' work	—	—	—	272,949	224,596	209,632
Other sorts (including wood ware and wood turnery) . . .	—	—	—	1,131,277	1,130,691	1,313,343
Total of Manufactures of Wood and Timber (including furniture) .	—	—	—	2,016,728	1,920,716	1,970,879

TABLE IV.—SHOWING THE EXPORTS OF WOOD AND TIMBER DURING 1906–1908.

—	Quantities			Values		
	1906	1907	1908	1906	1907	1908
WOOD AND TIMBER:				£	£	£
Rough, hewn, sawn, or split, and staves . . . (loads)	15,127	17,719	16,925	91,575	111,841	97,592
MANUFACTURES OF WOOD AND TIMBER;						
Furniture and Cabinet ware . .	—	—	—	760,334	801,603	661,649
House frames, fittings, &c. . .	—	—	—	—	—	—
Other sorts	—	—	—	545,362	606,329	594,896
Total of Manufactures of Wood and Timber	..	—	—	1,305,696	1,407,932	1,256,545

With 150,000 more bunches of Bananas received, the Return shows a reduced gross value of £2,000 compared with 1907, a pronounced reduction in prices. This fruit, and Lemons, show the highest increase in imports, and as both are foreign fruits, the general stability of the other outdoor fruits given in the Return would perhaps indicate that the home orchards are keeping pace with the increasing consumption—a consideration of satisfaction to fruit growers. The importations of Tomatos show a stationary figure for the past eight years, but those of Potatos reached a high level. The value of Fresh Flower imports is lower than the four preceding years by £4,000. This is satisfactory, as the four earlier years had been abnormally high in imports.

The exports call for little comment, as the figures show scarcely any or, perhaps, no variation beyond the average. The consumption of Oranges fell short of the previous year (1907), comparing imports and exports, by 364,000 cwt.

Imports and Exports of Wood and Timber.

The amount of unmanufactured timber imported is necessarily very high, though its value in 1908 fell short of the preceding year by nearly £300,000. Again, the value of imported manufactures of wood and timber increased by £50,000, while the value of the exports of this class of goods fell by £151,000. This would make British wood manufactures appear to be in a depressed condition, but comparing 1904 with 1908 we have valued exports of £170,258 and £1,256,545 respectively—a most wonderful comparison. Similarly the exports in 1903 were £179,902, and in 1902, £187,755, so that the advanced export of to-day is really highly satisfactory.

BOOK REVIEWS.

"The Practice of Forestry." By Percival Trentham Maw. 8vo., 503 pp. (Walter & Walter, Heatherside, Brockenhurst, Hants, 1909.) 17*s.* 6*d.* net.

During the last few years a number of books have been written on subjects connected with forestry—the outcome no doubt of the afforestation question.

The present work is a valuable addition to those already published, though the high price will no doubt considerably restrict its circulation amongst those for whom it is specially intended. The subjects are very broadly treated and more from a scientific than practical point of view, and include almost all that is necessary for the student of forestry. There is one sentence that we would like to emphasize and that is Mr. Maw's remark that "As regards forestry education, I should like to express my opinion that British foresters can only learn their forestry in this country." No more truthful words were ever expressed, and it is to be hoped that in conjunction with the afforesting of waste lands by the Crown this important fact will be steadily borne in mind.

The book is divided into eighteen chapters, some of the most important being "The Financial Aspect of Afforestation," "Average Yields from Forest Lands," "Natural Regeneration" and "As to the Choice of Trees to Plant." The latter is a sadly neglected point in British forestry, and mainly to this neglect is due the unproductive nature of many of our woodlands. The "Sylvicultural Notes on Timber Trees" contain little that is new, and it is wrong to suppose that the Western Plane (*Platanus occidentalis*) is at all common in this country.

Regarding the "Forest Tables," that on quarter-girth measurement is only an extension of Hopper's, while basal areas are little required.

Altogether the work is a valuable one and reflects credit on the compiler.

"The Boy's Own Nature Book." By W. P. Westell, F.L.S., M.B.O.U. 8vo., 374 pp. (Religious Tract Society, London, 1908.) 3*s.* 6*d.*

It is rather difficult to decide for what class of readers this book of Mr. Westell's is intended. From its title one would certainly imagine that it was for boys, but if so, what interest could Chapter II., consisting of 28 pages, be to them? It certainly contains many moral lessons and appears to be intended for their teachers and not for them. Why then insert it? One finds many half-tone figures taken from photographs which could not interest anyone but quite a child, such as a lamb, a mare and her foal, a Jersey cow, evidently taken in a show-yard, a full-faced view, which does not show the points of the animal. Some of the notes in "Nature's Year" are very trivial, and not worth mentioning. In commenting upon the many strange local names given to some birds, he says, "The common partridge probably possesses the most curious name of any British species of feathered folk in that of 'bird.'" It is evident that he has not mixed much with shooting men; in old times the name was no doubt given by them to the partridge, which was then the bird *par excellence* in their estimation, and to this day a sportsman will use the word "bird" when speaking of a partridge.

On page 252, in alluding to the grubs of "Ichneumon flies" the following curious expression is used: "In a word the little mite eats its own environment." The writer should have said the little grub, so as not to run any risk of being misunderstood; the word "environment" is hardly suitable for a boy's book, and it is generally used with a totally different significance. The author in writing about ichneumon flies is apparently dealing with a matter of which he knows nothing. They are insects belonging to the order *Hymenoptera*, and like the other members of the order have four wings, and as a rule their bodies are long and slender, and are very unlike the figures given. These figures represent two-winged flies belonging to the order *Diptera* and presumably to the family *Tachinidae*, a subdivision of the family *Muscidae* to which the common bluebottle flies and house flies belong. These flies, as well as the ichneumon flies, lay their eggs in the caterpillars of various insects, and the grubs when hatched devour their hosts in much the same way as the ichneumon grubs do. The figures illustrating this subject are very poor indeed.

The author is puzzled because the name of bittercress is given to the Lady's smock, or Cuckoo-flower (*Cardamine pratensis*), as the leaves have not a bitter flavour. But the term bittercress in various botanical works is applied to all the species belonging to this genus; one of the species is *C. amara*.

On page 283, the common oak galls known as "marble galls" are said to be "oak apples," which are a very different kind of gall, very much larger, of quite a different consistency, containing a large number of grubs, and not quite spherical as the marble galls are. The author's views as to the formation of oak galls are not those accepted at the present day; the cause of the formation of the galls is not the piercing of the tissues of the plant by the gall-fly when laying her eggs, but the action of the grub when it is hatched feeding on the tissues, which appears to cause a more abundant supply of the sap of the plant to that part, resulting in the abnormal growths known as galls. Should the grub die, the growth of the gall ceases, showing that it is the action of the grub which causes the growth.

The description of the cause of double apples is altogether incorrect. We do not find in the case of double apples that each has a separate stem as they would have "if the growth of two fruits in close proximity to one another became fused together, thus forming a double fruit." The explanation of the monstrosity is that two flowers were formed on the same pedicel so that they were in such close proximity that there was a fusion of the two young fruits.

In a pocket in the cover at the end of the book are two folded plates, one of the British butterflies, the other of their caterpillars and those of some moths. These insects are briefly described in two appendices. The figures of the butterflies are fairly good, but some of those of the caterpillars are regular caricatures. No indication is given of the real size of the butterflies, which is a great omission. Unmounted folded plates soon become useless in the hands of an ordinary boy. The book is well printed and profusely illustrated, but many of the plates, in spite of the praise bestowed on them, are very poor, and of very trivial subjects. We cannot altogether congratulate the Religious Tract Society on the publication of this volume, or the author on its compilation.

"That Rock Garden of Ours." By Professor F. E. Hulme. 8vo., 328 pp. (Fisher Unwin, London, 1909.) 10*s*. 6*d*. net.

Professor Hulme very wisely does not waste much space in the introductory words of this welcome volume, but quickly plunges into the book itself, which is written in a most practical and interesting style, quite different from many works dealing with horticulture. The whole book is filled from cover to cover with the author's life experience of plants and their habits, and the many qualities or virtues that plants were supposed by our ancestors to possess. A mass of information is given on the conditions most suitable for rock plants. Some curious facts illustrating the distribution of plants are given, as, for instance: A house was pulled down in Whitehall; it had no garden attached, the only open space being a paved stable-yard, which was covered with brick rubbish, mortar, and the like; yet on this unpromising material there sprang up rosebay and thirty-four other flowering plants, besides numerous grasses and bracken. From a ball of clay taken from a partridge's foot Darwin grew eighty-two plants belonging to six different species. Grass seed was sent to Japan to sow on railway embankments, and with the grass seed were various wild plants; many of these, as the daisy, buttercup, and dandelion, have settled happily in their alien surroundings. However, to return to the rock plants, we are glad to see the author recommending very strongly many plants considered too common for the rockery in these days, particularly ferns and other plants which are found growing naturally on rocks and cliffs, and surely deserve a place on all rockeries. The book is excellently printed, with eight coloured plates and forty-two other illustrations.

"The Laying-out and Upkeep of Golf Courses and Putting Greens." By Martin H. F. Sutton. Obl. 8vo., 46 pp. (Simpkin, Marshall, London, 1908.) 2*s*. 6*d*. net.

This is one of the most practical publications that we have on the making and care of golf courses. The advice on the drainage, preparation of soils, enriching soils, quantity and selection of the proper seeds to sow on different soils, is exactly the information that many of us want. We were a little surprised to find Mr. Sutton expressing an unfavourable opinion of *Poa annua* for the formation of turf, our experience being that few if any grasses will stand more wear and tear on a poor soil, but we are in complete accord with him in speaking well of all the grasses he names. *Festuca ovina tenuifolia*, *Poa pratensis*, and *Festuca duriuscula* are all good wearing grasses. The information on the upkeep and improvement of greens and the manures to use is valuable. There is no doubt that this subject has not been as carefully thought out in many places as it should have been, and manures have been used that have had the effect of covering the greens with clover. Mr. Sutton says "the application of farm-yard manure as a top-dressing cannot be tolerated for a moment. It is both offensive and unsightly." Another reason may be added: it is liable to cause a quantity of noxious weeds to spring up, and result in no end of trouble to eradicate them. A great deal of other valuable advice is given of the most practical character, that will be most serviceable to golf players, and to those who have lawns.

"Studies in Fossil Botany." By D. H. Scott, M.A., LL.D., F.R.S. Ed. 2. Vol i. Pteridophyta. 8vo., 363 pp. (Black, London, 1908.) 6*s.* net.

This work is one which no advanced student of botany or geology can afford to neglect. The first edition of Dr. Scott's "Studies in Fossil Botany" published in 1904, was based on a course of lectures given at University College, London, in 1896. The matter contained in these lectures was brought up to date in 1904, and the book then published at once took first place among works dealing with Fossil Botany. The style, at once simple and lucid, without being merely "popular" in the less reputable sense of that term, made the book one which could be read and enjoyed, as few books can be which deal so thoroughly with any branch of knowledge. But, as the author stated in 1904, "happily Fossil Botany is an eminently progressive branch of science and thus the mere lapse of time has necessitated the introduction of much new matter and of many new points of view." This is still more true at the present time. The progress of the science has necessitated remodelling and almost completely rewriting the book.

The discoveries of Oliver, Kidston and others, including the author himself, have brought to our notice the great Paleozoic group of fern-like seed-bearing plants the Pteridosperms. Fossils, formerly thought to belong to the ferns proper, have been (metaphorically) "pieced together" with wonderful skill and industry to form seed-bearing types of the new group. But the ferns proper have not been neglected. The ancient synthetic group, the *Botryopterideae,* have been more fully investigated and must, of necessity, be considered in any scheme dealing with the phylogeny of Pteridophytes. In America Dr. Wieland has published the results of many years' labour on American fossil Cycads and his discovery of the hermaphrodite strobilus of *Cycadoidea ingens* has stimulated research and speculation concerning the origin of the Angiosperms. Such discoveries as these could best be described and collated by the author of "Studies in Fossil Botany," and Dr. Scott has decided to bring out the new edition in two volumes.

The first volume, dealing with Pteridophyta, contains less that is new than will be given in Part II.; hence its earlier publication. The chief additions to Part I. include work by Mr. Hickling on *Paleostachya* and M. Halle's researches on Mesozoic Equisetales. Dr. Scott's own work on *Sphenophyllum fertile* and Prof. Nathorst's discovery of the Pseudoborniales are described. The probable connection between the Sphenophyllales and the Equisetales is clearly and critically discussed as well as the connection between the *Psilotaceae* and the *Sphenophyllaceae.* In the

Lycopodiales stress is laid on the development of the "seed habit" in plants (*Lepidocarpon* and *Miadesmia*) which are remote from the main line of the descent of seed-bearing families. Necessarily, the chapters on Paleozoic ferns have been much altered, descriptions of many "fern fronds" and "fern impressions" being transferred to Part II., since many of these fossil "ferns" have now been shown to be Pteridosperms.

The ferns proper receive full and accurate treatment; doubtful cases are discussed and the new work on the *Botryopterideae* is thoroughly well described and critically considered. The book is admirably illustrated by photographs reproduced from original papers and by clear drawings by Mrs. D. H. Scott and Mr. G. T. Gwilliam. It is a work which will make the reader impatient for Part II., and we trust that in view of the importance of recent work on Fossil Spermaphyta the publication of the second volume will not be long delayed.

"Trees and Shrubs of the British Isles, Native and Acclimatised." By C. S. Cooper, F.R.H.S., and W. Percival Westell, F.L.S. Part I. 4to., xii + 12 pp. (Dent, London, 1909). 1*s.* net.

Though there is little new in this book, yet the minutely accurate and beautifully executed illustrations—indeed the whole get up of the work—should recommend it to everyone who is interested in the trees and shrubs that have been found suitable for cultivation in this country. The work is to be completed in sixteen parts, and if the succeeding numbers be equal to the first the whole will form a useful book, while the low price will bring it within the reach of all. We are promised chapters on almost every subject bearing on trees and shrubs—soils, planting, insect and fungoid pests, the age of trees, commercial products, plea for an Arbor Day, seed, re-afforestation. Than the coloured picture of the strawberry tree (*Arbutus Unedo*) which accompanies the first part of the book nothing more accurate or beautiful could be desired.

"Our Forests and Woodlands." By John Nisbet. New and revised edition. 8vo., 348 pp. (Dent, London, 1909.) 3*s.* 6*d.* net.

If only for the chapter on "Ancient and Modern Forestry" this book is well worth perusal, and Mr. Nisbet is certainly to be congratulated on the result of his research in that way, for a fuller account of the rise and progress of forestry in this country has not before appeared. We would strongly recommend everyone who has an interest in forestry to read the chapter. Regarding the rest of the book, there is nothing new, the descriptions of our commonly cultivated trees and the uses to which the timbers are applied being old news re-garnished and freshly dished up. The work is pleasantly written, sparsely illustrated, and being cheap will come within the reach of all.

"The Moths of the British Isles." By R. South, F.E.S. Second series. 8vo., 376 pp. (Warne, London, 1908.) 7*s.* 6*d.* net.

Messrs. Warne have recently published the second series of "The Moths of the British Isles comprising the families *Noctuidae* to *Hepialidae*," which under the new classification of these insects also includes the *Geometridae*, *Zygaenidae* (or Burnet flies), *Cossidae* (Goat moth), *Sesiidae* (Clear wings), so that the three volumes by Mr. South—the Butterflies and the first and second series of Moths—contain figures and descriptions of all the British Lepidoptera except those commonly known as Micro-Lepidoptera (the *Tortrices* and *Tineae*). The author in his preface says, speaking of these: "The small fry, as they have been called, exceedingly interesting though they may be to a limited number of students, have therefore been left for separate treatment at some more convenient season." All collectors of British Lepidoptera will earnestly hope that Mr. South will soon find this "more convenient season," for though the students of the Micro-Lepidoptera may not be so numerous as those who study the more attractive groups, their numbers would soon increase if they had a volume similar to those already published to help them. This volume, like its predecessors, is admirably got up. The coloured plates are excellent; No. 41 is perhaps the least satisfactory, the colours of the moths (the large and small emerald) do not show up well against the tinted background. The black-and-white figures are very clear, but are rather hard and diagrammatic; the hardness may be accounted for to some extent by the smoothness of the paper on which they are printed; they, however, serve their purpose very well. The letterpress gives terse but very clear descriptions of each species both in the perfect and caterpillar states, with some details of their life history and the localities where they may be found. In the preface we read: "Both classification and nomenclature are always under revision, and we are probably a long way from hearing the last word concerning either; these are, however, matters that cannot be ignored even in a popular work, consequently I have ventured to adopt sundry changes in arrangement and names although not departing from the old style in any very large way, still approach pretty closely to the new." It would have been of great assistance, however, in this matter if a table had been given showing the classification adopted in this work, which should be in the hands of everyone who collects or is interested in British Lepidoptera. There is no other book which can be said to cover the same ground in such a thoroughly satisfactory manner.

"Beautiful Flowers and How to Grow Them." By Horace J. Wright and W. P. Wright. Complete in 17 parts (Jack, London, 1906). 1s. each part.

We have before us the first nine parts of this work, which is admirably printed and artistically got up. When we state that there are 100 coloured plates by such talented artists as Beatrice Parsons, Eleanor Fortescue Brickdale, Anna Lea-Merritt, Hugh L. Norris, Lilian Stannard, Margaret Waterfield, A. Fairfax Muckley, and Francis E. James, it is at once evident how well they are done. The first part is given up entirely to roses, the second part principally to bulbs, which run well into the third part, and the fourth and fifth parts entirely to herbaceous plants. The sixth part is chiefly devoted to rock plants, of which a capital descriptive list is given, and good cultural hints. Parts 7 and 8 are nearly all taken up with stove and greenhouse plants, the kinds and varieties finding most favour being dealt with in a very practical manner.

Part 9 is largely devoted to window and room plants, and finishes Vol. I., filling 200 pages. Vol. II. commences in this part, and begins with a chapter on Carnations followed by one on Dahlias.

"The Flowers and Gardens of Japan." Painted by Ella du Cane. Described by Florence du Cane. Sm. 4to., 294 pp. (Black, London, 1908.) 20*s.* net.

In the very first sentence of her preface to "The Flowers and Gardens of Japan" Miss Florence du Cane makes a statement with which it is impossible to agree. She says "An apology is due to the reader for adding this volume to the long list of books already written on Japan." For such an altogether delightful book no apology whatever is needed, but rather the thanks of all flower-lovers are due to the Misses du Cane for giving them a charming book on a fascinating subject. This is not a great book, nor a deep book, nor does it pretend to be a text-book. Readers wishing to study seriously the mysteries of Japanese landscape gardening with all its symbolism and its rigid laws and ceremonies are referred to Mr. Condor's wonderful "Landscape Gardening in Japan." As Condor caters for the student, so the Misses du Cane cater for the *dilettante*, and give us the flowers and gardens of Japan as seen through European eyes. The illustrations are typically from the European standpoint. The predominant idea in a Japanese garden is form and line and proportion. Colour is rather a secondary consideration. Not a word need be said against the form and line and proportion in Miss du Cane's paintings, but it is evident in practically very one of the fifty drawings reproduced that colour, in a charming setting, but always colour was the main factor which impelled her to paint. This is of course as it should be in a book whose object it is to charm rather than to instruct, to show us the gardens of Japan as we should see them rather than as the Japanese see them.

As examples of "three-colour" reproduction from water-colour drawings these illustrations are very fine indeed. Miss du Cane gives a feeling of atmosphere in an extraordinarily clever way. Some of her drawings drag you right out into the open air. The texture and modelling of her rocks and stones are very subtle, and the accuracy, with breadth of treatment, of her flower masses most fresh and satisfying; yet happily, in reproducing and reducing her paintings for book illustration, these fine qualities have been preserved wonderfully well.

Charming as are the paintings illustrating "The Flowers and Gardens of Japan," the letterpress is equally interesting and delightful. A great amount of Japanese garden lore, together with many excellent pieces of descriptive writing, are given. The first chapter deals with Landscape Gardening. Although we may learn much from the Japanese in this art, how futile it seems to attempt a true Japanese garden in England! It is probable that no Englishman would ever make the real thing. Even after a life's study of the subtle technicalities of the art he would lack the Japanese mind, and to his unlearned fellow-countrymen his work would remain a curiosity with some beautiful points and many meaningless accessories. Let us learn from the Japanese, not imitate them parrot-wise. It would be better almost to stick to a good honest circle of scarlet, blue and yellow, of geranium, lobelia and calceolaria, than produce some of the hybrid atrocities which have recently been perpetrated in this country under the name of Japanese Gardens. Chapter II. deals with Stones, Ornaments and Fences, and Chapter III. with Landscape Gardens; and then follow chapters devoted to Nursery Gardens, Dwarf Trees and Hachi-Niwa, the wonderful miniature landscape gardens representing whole scenes within the space of a shallow dish. The night fairs in Kyoto must be fascinating. Miss du Cane says of them: "On April 1 the best night-market is held. The stalls will be covered with tempting little flowering trees, their buds almost bursting and full of promise of lovely blossoms to come; sturdy little peach trees, their branches thickly covered with soft velvet buds just tinged with pink; drooping cherries wreathed with red-brown buds; slender Pyrus trained into wonderful twisted shapes; little groves of maple trees, their scarlet or bronze leaves just unfurling; or miniature forests of larch, shading mossy ravines with rivers of white sand; ancient pine trees spreading their branches over rocky precipices rising from a bed of pebbles; sweet-scented Daphnes, golden-flowered Forsythias, and early Azaleas in porcelain dishes, which are round or oval, shallow or deep, and of every shade, from white through soft greys and blues to a deep green." These treasures are to be bought at from a few sen to two or three yen! Then follow an interesting chapter on Temple Gardens, and a delightful one on Summer Flowers. In May Miss du Cane visited Matsushima, the land of the pine clad islands, and later Nikko, to see the Azaleas, a gorgeous feast of colour. Her description of *Lilium auratum* in its wild state is worth noting from a cultural point of view. She says: "By the middle of July the big buds of *Lilium auratum* will be fighting their way through the rank growth along the roadside, and in a few days the air will be filled with their scent. Often I was attracted by their fragrance, perhaps all the more remarkable in a land which alas! is not famed for sweet smells, and then far above one's head, hanging defiantly out of reach, could be seen a single splendid bloom of this king among lilies. They seem to love the shelter and dampness of the wood, where the falling leaves each autumn make a fresh covering for their bulbs. Once I tried to see how deep in the earth the bulbs were buried, but I did not succeed in getting down low enough, and could only tell, from the mark on the stem of the lily which had been pulled, that about 8 or 10 inches seemed to be the usual depth of the bulb." How often gardeners in England fail to get Lilium auratum to grow, through not planting it deep enough! Other chapters deal with Peach, Plum and Cherry blossom, Wistaria and Paeony, the Iris, the Chrysanthemum, Maple, Pine and Bamboo, &c.

"The Flowers and Gardens of Japan" is a book to read as well as to look at, and, as has already been said, no apology for its production is necessary.

"The Florist's Bibliography." By C. Harman Payne. 8vo., 80 pp. (Wesley, London, 1908.) 3*s.* 6*d.* net.

This book has been prepared by a lover of books, and is a useful guide to those forming a library dealing with florists, flowers, and the flower garden.

There is a curious frontispiece which has been copied from an old French work on the auricula published in 1738, evidently taken at a time when auriculas were not in flower, as those represented are caricatures. Mr. Payne is a book collector, a lover of old gardening books, and the preparation of this book has been a labour of love to him. There is one important omission, as the author mentions in the preface, the rose. He says there is "no need to go over the ground again that has been traversed by Señor Vergara, although a supplement to his 'Bibliografia de la Rosa' might now be reasonably considered desirable." The author has quoted from first editions as far as practicable. The book is useful also in letting us know what we want as well as what we have. There are nine works mentioned dealing with the auricula, but the latest is fifty years old. The auricula is a more popular flower, and much better grown now than it used to be; as its culture is better understood there is room therefore for a trustworthy treatise on the auricula. Indeed the author of the treatise alluded to has passed away, but he was not a cultivator. The date is 1857. Bulbs and bulb culture have been well dealt with in quite recent years; the latest book is by Mr. John Weathers ("Beautiful Bulbous Plants, 1905"). There are many old and modern books on the Hyacinth and also on the Lily; and, showing the importance of the Tulip, there are twenty-four books dealing with it, the oldest dated 1654, the newest 1907. The Carnation, Picotee and Pink are credited with forty-eight works beginning with "Le Jardinage des Œillets," Paris, 1647, by "L. B.," and the latest, also published in Paris, "Essais sur l'histoire de quelques fleurs d'ornement: L'Œillets" (Le Texnier, 1908). Of course the carnation had been written about in the sixteenth century, although not in the form of a special treatise; the importance of the Chrysanthemum as a garden favourite is amply demonstrated by the fact that no fewer than 103 books are enumerated and thirty-three society publications. Of course there would be no book on the chrysanthemum earlier than the nineteenth century: the earliest quoted by Mr. Payne was published in Vienna in 1833 by J. B. Rupprecht; the earliest in England in 1843 by Mr. Tyas. The late Mr. J. Dale, of the Temple Gardens, wrote an excellent treatise which was published in 1856. Modern books are plentiful on this subject. Thirty-six books are enumerated dealing with the dahlia, and several society publications. The dahlia seems to have occupied public attention in France earlier than in Britain. Jacquin Frères published an essay on 'the cultivation, classification, and nomenclature of the dahlia as early as 1828, and between that date and 1841 inclusive there were twelve books published in France dealing with it.

No one but a lover of books would have taken the trouble involved in searching out and classifying such a large number of books in English, French, and German, treating on every subject connected with the flower garden, and especially with what are termed florist's flowers. The book should find a place in every garden library.

"Little Gardens, and How to Make the Most of Them." By H. H. Thomas. 8vo., 152 pp. (Cassell, London, 1908.) 1*s.* net; cloth 1*s.* 6*d.* net.

A capital little book for the amateur, full of the information he needs, clearly dealing with the making of a garden and all it entails. In the next edition we would suggest to the author to add "English or Broad-leaved" to Paradise stock on p. 143, as this is infinitely superior to the French Paradise stock: the latter should never be used in this country when planting bush or pyramid trained trees. We also think it must have been a printer's error to place "Beauty of Bath" amongst cooking apples, as this is of no value for cocking, but is one of the best early dessert varieties. With these exceptions we have nothing but praise for the little work.

"Garden Rockery: How to Make, Plant, and Manage It." By Francis George Heath. 8vo., 173 pp. (Routledge, London, 1908.) 1*s.*

To anyone about to construct a rockery this will be a very useful book, as it points out what to do and what to avoid. With many the tendency is to attempt too much, to use too much stone, making the rockery very artificial instead of natural. Again, the way in which stones are placed in the rockery is of vast importance, and here the instructions of the author will be most serviceable, showing by illustration how they should be fixed. There is an excellent list of plants suitable for the rockery, and the whole is well printed and illustrated.

"Alpines and Bog Plants." By Reginald Farrer. 8vo., 288 pp. (Arnold, London, 1908.) 7*s.* 6*d.* net.

This may be described as a companion book to "My Rock Garden," being written and printed in the same style. The present volume is sure to be appreciated, as it treats a very popular phase of present-day gardening, and we venture to think a phase that will become still more popular, as many garden-owners are now taking less interest in their glass erections, and developing Alpine, bog, and water gardening to an extent probably never equalled before. From the first chapter on "Shrubs and their Placing" and the second chapter on "Shrubs, mostly Evergreen," one may learn valuable lessons, as the author has studied the plants in their native habitat, and tells us under exactly what conditions they seem to thrive best. We are glad Mr. Farrer points out the hardiness of so many beautiful shrubs, as many who really love their garden have still little idea of the wealth of hardy shrubs; the beautiful *Nandina domestica* with its handsome foliage, for instance, so rarely seen, and quite as hardy as the common laurel, but infinitely more beautiful. The same applies to climbing plants; many still plant *Wistaria sinensis*, and we agree with the author that at her best she is but a poor pallid widow compared with the bridal opulence of *Wistaria multijuga*. This is only one example of what Mr. Farrer points out as desirable improvements in our gardens; there are many others quite as good. The other chapters on Alpine plants, large and small Bog plants, Iris, Lilies, the Water Garden, &c., are all admirably written, and in such a clear manner that no one can fail to follow the author and his ideas all through the book. The illustrations are excellent.

"The Book of the Pansy, Viola, and Violet." By Howard H. Crane. 8vo. 106 pp. (Lane, London, 1908.) 2*s.* 6*d.* net.

In this book we have an excellent history of the pansy and viola, with exceedingly good chapters on their uses and cultivation, the insect and fungoid pests that attack them, &c. Only a comparatively short chapter is given to the cultivation of the violet, with another one on the best varieties to grow. Where the violet is attacked by that persistent fungus that causes yellowish brown spots on the foliage, we cannot do better than quote the author's advice on p. 54: "Whenever this is seen the affected stem should immediately be removed and destroyed. Do not throw these diseased pieces on the rubbish-heap, but burn them." Although this advice is given for the disease on pansies and violas, it is equally good for the violet. We regret the author recommends the use of Violas as a groundwork for roses: our experience is most decidedly against it, as the rich food usually given to roses caused rampant growth in the violas, often a foot or more high, making the roses leggy in growth, and we also find a much greater percentage of deaths amongst the roses carpeted with violas than amongst those free from any carpet plant. The viola is so beautiful from early in the year till quite late in the season, that it is indispensable in most gardens, and we thoroughly endorse all that Mr. Crane says in its favour. We can confidently recommend the book to all lovers of these charming flowers, as it is full of sound practical information, that may be followed out easily by anyone.

"The Illustrated Strawberry Culturist." By Andrew S. Fuller. 8vo., 59 pp. (Kegan Paul, London, 1908.) 1*s.* 6*d.*

This book was written for American readers, and scarcely one of the varieties of strawberries named are known in this country; still there is so much interesting matter and a good deal of useful information in the book, that it is well worth the British grower's perusal.

"Gardens, Past and Present." By K. L. Davidson. 8vo., 232 pp. (Laurie, London.) 6*s.* net.

We have seldom read a book more pleasantly written or better printed than this. Many gardening books are dry and uninteresting except to the enthusiast, but even the least enthusiastic gardener will read these pages with pleasure and profit. Mr. Davidson tells us how in the far past ages, after the Roman Invasion, Julius Agricola fostered the cultivation of the land so much that, under him and his successors, Britain became one of the granaries of the world. He traces the history of the formation of physic gardens, and how the cultivation of vegetables was increased and became general through the settling of Flemish cloth-workers in this country. The chapter on "Trees Native and Naturalised" is very interesting. Naturally Kew takes the premier place as a Botanic Garden, and the author writes in an enthusiastic strain of its beauties and its practical assistance to the community, while the gardens at Edinburgh, Dublin, and other places receive their fair share of praise.

In the second part of the book present gardens are equally admirably dealt with, and most will agree with the author that the question of style should be governed by environment only, and not by any passing fashion of the day. To do away with formality in some of our old gardens would be to ruin them absolutely, yet occasionally we see this occurring.

"Bulbs and their Cultivation." By T. W. Sanders, F.L.S. 8vo., 212 pp. (Collingridge, London, 1908.) 2*s.* 6*d.* net.

Like all the books written by this author, this work is full of sound practical advice and information, put together in such clear and pleasing style that it gives not only profit but also pleasure to read it. The book is divided into three parts.

The first part treats of hardy bulbs of all kinds, soils, manures, bulbs in beds, borders, and on rockeries, the naturalizing of bulbs, lifting and storing, outdoor lilies, bulbs in window boxes, &c., and a useful tabular list of bulbs.

The second part is devoted to indoor bulbs, and embraces the cultivation of almost every kind of bulb for the stove, warm or cool greenhouse, frames in water, and in fibre, forcing, &c. The soil, treatment, feeding, and other matters of both great and small importance are well dealt with, and no one can go far wrong in following the instructions.

The third part is taken up with the propagation of bulbs and tubers, their English names, pests and diseases, selections of the best varieties, and a most useful glossary of terms. We commend this book to all.

"The Book of Fern Culture." By Alfred Hemsley, F.R.H.S. 8vo., 112 pp. (Lane, London, 1908.) 2*s.* 6*d.* net.

As might be expected from such a well-known plant-grower as Mr. Hemsley, this book is an excellent addition to the multitude of books now published on horticultural subjects. It is a pleasure to see the author advocating a sensible and economic system of growing ferns, *i.e.* treating them more like ordinary plants instead of keeping them in an atmosphere heavily charged with moisture. Every phase of fern culture, from the raising of the plants from spores to plants of the largest size, is dealt with; composts for different kinds and the very important subject of watering are admirably gone into.

"Stephens' Book of the Farm." Div. II. By J. Macdonald. 8vo., 280 pp. + many fine plates. (Blackwood, London, 1908.) 10*s.* 6*d.*

Div. I. of this work was reviewed in the last volume of this Journal, and the opinion then expressed applies to this book.

The subjects dealt with include Rent and Wages; Soils and Soil Improvement; Rotations; Manures and Methods of Application.

We consider this work the best of its kind available at the moment, although severe competitors are now appearing.

"Handbook of Geography, Descriptive and Mathematical." By Dr. Emil Reich. 8vo., 2 vols., 568 pp. + 171 pp., 10 coloured maps, and many figs. (Duckworth, London, 1908.) 12*s.* 6*d.* net.

This work consists of two volumes, the first entitled "A Descriptive Geography of the World" and the second devoted to Astronomical or Mathematical Geography. The author tells us that "the first part, or Descriptive Geography, treats of the various countries of the five continents, and the chief aim was to enable the reader to form a fair image of each bigger landscape, or, in other words, to view each country, or big sections thereof, from a standpoint so high in air as to admit of taking in at a glance entire provinces." We cannot say that he has succeeded in his effort, for he does not appear to have worked on any definite plan. Many of his pages contain innumerable short sentences and disjointed expressions in note form, making the reading very monotonous and even painful. The opening chapter on the British Isles covers thirteen pages, and deals entirely with physical features, no mention being made of our large towns and industrial centres. In some other chapters the method is reversed, for we find descriptions of towns but much less physical geography. India is treated in this way, and this forms one of the most interesting chapters, but the great range of the Himalayas is practically ignored. The description of the United States of America covers forty-two pages, and contains much useful information, but the vast Dominion of Canada is dismissed in six pages. The admirable set of maps would have better served their purpose had they been accompanied by some explanation in the text.

The feeling of disappointment with which one closes the first volume is speedily dissipated on opening the second, and one soon finds that here the author has succeeded in producing a book which should prove of the greatest use to both teachers and students.

"Ruskin Nature Reader." Senior Book. Small 8vo., 236 pp., 20 illustrations. (Dent, London, 1908.) 1*s*. 6*d*. net.

This is described as "a collection of literary extracts to accompany a course of Nature Study; selected and edited by G. R. Bennett, B.Sc. (London)." Of the many so-called Nature Readers which have been produced in the last few years this is one of the most readable. An effort has been made to show "how Nature has appealed to men, and how men have expressed the influence which the observation of Nature has had upon their thoughts and their actions." How successfully this effort has been achieved is evident from even a cursory glance through the selected passages. We say a cursory glance, but we doubt whether any sensible scholar opening these pages will be satisfied till he has perused them all, and at the close he cannot but feel that he has been abroad with Dame Nature indeed.

The Editor has drawn largely on the friend of our youth, Gilbert White's "Natural History of Selborne," and has given us six charming extracts dealing with bird-life. The language is, of course, somewhat quaint, having an old-world ring about it, a certain charm of its own; but we would suggest that it might be worth while to conform to modern usages and modify such expressions as "an hundred pieces" (p. 13), "an hawk appears" (p. 36), "an hot stifled inn-yard (p. 41), &c. We also note a slight typographical error on p. 35. Gilbert White certainly did not write "the motion of the mandibles *are* too quick for the eye." The choice of selections has been admirable, and we can heartily join with the Editor in his wish that, having been given a glimpse of the emotions and expressions of such men as John Ruskin, Professor Tyndall, Richard Jeffries, Louis Stevenson and Sir Martin Conway, boys and girls may be helped "to observe for themselves the things around them, and also to read and enjoy the beautiful thoughts of others concerning them." The illustrations are good, but we should like to see a note made of the page to which each applies.

"Nature Study." By Professor Ainsworth Davis. Crown 8vo., 274 pp., over 100 photographic illustrations. (Dent, London, 1908.) 2*s.* 6*d.*

This is a Reader for the higher classes of schools, and attempts "to give in simple, non-technical language a connected sketch of the natural history of plants and animals." The book is divided into two parts, the first dealing with Botany and the second with Zoology. The botanical section is treated on the ecological plan, and the author has succeeded in producing a very readable introduction to plant study. The scholar is encouraged to carry out simple experiments, make careful observations, and draw conclusions as to how the details of form and structure have a definite meaning in relation to mode of life. There are two excellent chapters on the Struggle for Existence among Plants. A general survey is taken of our more common plants, and details of special interest pointed out. The second part of the book deals mainly with the classification of animals, and, although useful in its way, can scarcely be said to follow out the admirable plan of the botanical section. The author attempts to cover practically the whole of the animal kingdom, with the result that whole groups of animals have to be dismissed in a paragraph, and one has but little chance of making those observations which are supposed to be an essential feature of the new method of teaching.

On p. 70 we are told that "Begonia plants can be grown from a leaf, which develops roots and buds when placed in damp soil." This statement goes scarcely far enough, and might mislead a young reader. Reference might have been made to the method of insertion, and to the incisions usually made across the principal veins. The latter part of paragraph 425 (p. 151) seems scarcely grammatical, where it says: "The lamprey group (Cyclostomata) is an eel-shaped relative of the fishes, which has not yet developed a lower jaw, and uses its round mouth as a sucker." The illustrations are some of the best that we have seen employed for the embellishment of a school-reader, and we have no hesitation in saying that on the whole this is an excellent help to nature study in the schools.

"Eversley Gardens and Others." By Rose G. Kingsley. 8vo., 280 pp. (Allen, London, 1907.) 6*s.* net.

A well-printed and well-written book dealing with the making of a garden, soils, planting, pruning, spring gardens, bulbs, summer gardens, the rose garden, cut flowers, &c. The illustrations are very good, and a great deal of most useful information is given on the best methods of treating plants individually and collectively, showing a keen observing power on the part of the authoress. It is a handsome book, and will be highly appreciated by garden-lovers.

"Holly, Yew, and Box, with Chapters on other Evergreens." By W. Dallimore. 8vo., 284 pp., 175 illustrations. (Lane, London, 1908.) 7*s.* 6*d.* net.

We must congratulate Mr. Dallimore on this carefully written and admirably printed book. Such a practical work could only be compiled by one thoroughly conversant with the many varieties of the plants he deals with. Mr. Dallimore's position as foreman of the Arboretum at the Royal Gardens, Kew, has given him unique opportunities for studying the peculiarities of all the varieties under his charge. Very valuable information is given on the habits of varieties of holly, yew, and box, and cultural descriptions are treated in a masterly manner. It is scarcely necessary to state that the work is well up to date, as proved by the inclusion of varieties new to this country from China, collected by Mr. E. H. Wilson for Messrs. J. Veitch. Many old and rare varieties are described, making the work one of special interest to tree and shrub lovers. A small portion at the end of the book is devoted to the evergreen oak, the laurel, and other evergreens, all as much worthy of the reader's attention as the other parts of the work. We predict this will be considered the standard book on the holly, yew, and box. The index is excellent.

"The Care of Natural Monuments with special reference to Great Britain and Germany." By H. Conwentz, Prussian State Commissioner for the Care of Natural Monuments. With ten illustrations. 8vo., pp. xii. and 185. (Cambridge University Press, 1909.) 2*s*. 6*d*. net.

We are not sure that the term "natural monument," the German *Naturdenkmal*, is either self-explanatory or otherwise satisfactory, though we cannot suggest anything better. Professor Conwentz makes out a good case for his neologism. Not only can he urge that standard works are styled monuments of literature, and that lake-dwellings, which were certainly never "established in commemoration" of any body or event, are termed prehistoric monuments; but that Humboldt long ago spoke of big trees as *monuments de la nature*.

This modest but usefully comprehensive little volume, which originated in a lecture delivered by the author at the Leicester (1907) meeting of the British Association, practically begins with a classification of the natural monuments in danger. It then deals with the means of preservation and the extent to which these are realized in the various countries of the world, concluding with suggestions for the future.

Professor Conwentz groups the monuments of which he treats under seven heads; views, water (especially falls), rocks, such as the Cheddar gorge, the Marlborough Sarsen stones, or erratic boulders, fens, woods, plants, and animals. The three aims to which preservative efforts should be directed are, he says, an inventory and map, actual preservation *in loco*, and the publication of accounts of these monuments. As to the means adopted in various countries to realize these ideals, we have government surveys and maps, voluntary associations for similar purposes, such as our Central Committee for the Survey and Study of British Vegetation, and the work of individuals, such as Hewett Watson. Secondly we have national reservations; a state office, such as that in Prussia of which Herr Conwentz is the head; areas protected by public corporations, such as the London County Council, which controls not only public parks, but also open spaces such as Riddlesdown, and the Corporation of London, with Epping Forest and Burnham Beeches; and voluntary bodies such as our excellent National Trust. There is actual legislation such as our Wild

Birds' Protection Acts, the laws protecting rare plants in Switzerland, and the international agreement of 1900 as to big game in Africa. There are the numerous private societies for influencing public opinion, such as the Audubon Societies in America, our Selborne Society, the Swiss "Association pour la protection des plantes" and the Belgian "Société pour la protection des sites"; and there are the now numerous county photographic surveys, which, by the by, our author seems to have overlooked.

Professor Conwentz rightly dwells or the great amount already done in this matter by private effort, especially in the United Kingdom, as for example the many handsome presents made to the nation through the National Trust. We are therefore not surprised to find him, although himself the head of a state department, deprecating government action in this matter in Britain. If we do not altogether agree with this conclusion, we none the less feel deeply indebted to the enthusiasm, the industry and the ability of the learned professor for this useful compendium, written, as it is, in faultless English, and concluding complimentarily with Shakespeare's question, 'Who is here so vile that will not love his country.'

"Experimental Morphology." By Dr. C. B. Davenport. 8vo., 509 pp. (Macmillan, London, 1908.) 15*s.* net.

The study of the different forms assumed by plants and animals early attracted great attention; later, the manner of development of these forms was studied; and now attention is being more and more directed towards inquiries into the reasons why organisms develop as they do and what the forces are which direct the path development shall follow. This study of experimental morphology is comparatively new and very much remains yet to be done. The primary aim of the book under review is to give an account of what is known at present concerning the subject in such a manner "as to indicate the directions for further research." Each chapter contains an account of the action of different external conditions upon protoplasm itself or upon that peculiar phenomenon exhibited by protoplasm called growth, and concludes with a list of the principal papers already published dealing with the particular branch of the subject of which it treats. The book abounds with details of experiments upon such subjects as the effect of chemical agents upon protoplasm and upon growth, and the effects of water, density, contact, gravity, electricity and so on, considered in relation to the living stuff itself and in relation to growth. A large proportion of the experiments relate to animals, but all the principal effects upon plants are touched upon.

This edition appears to be an issue of the original two volumes in one but otherwise unchanged. None of the research of the last twelve years is therefore included. It is to be hoped, for the sake of workers now in the field, that a new edition will soon be called for, when the author may increase the indebtedness of fellow-workers to him by bringing his book down to date.

"British Mosses." By the Right Hon. Sir Edward Fry, G.C.B. 2nd ed. 8vo., 72 pp. (Witherby, London, 1908.) 1*s.* 6*d.* net.

To those who desire to gain an insight into the structure of mosses and the work they do in the world, this little book can be heartily recommended, and none who reads it can fail to have his interest awakened by the lucid account of the mosses, "the first mercy of the earth," which it contains. The book is abundantly illustrated and the figures in this second edition are a great improvement upon those of its predecessor.

"An Introduction to Geology." By Prof. W. B. Scott. 2nd. ed. 8vo., 816 pp. (Macmillan, New York, 1907.) 11*s*. net.

The second edition of this well-known text-book has been thoroughly revised and brought up to date, several of the illustrations, for instance, showing phenomena due to the great San Francisco earthquake of 1906. The plan of the book is to describe first the principal rock-forming minerals; secondly to consider the various forces that have been at work in moulding the crust of the earth, dealing with volcanic agencies and the work of earthquakes, and with those surface changes which will more closely appeal to the garden designer, due to the action of water in its different forms; thirdly, the structure of the rocks themselves is dealt with; then the form of the earth, its mountains and river basins, and so on; finally, an account of the sequence of events in geological time with descriptions of the fossils found in the different strata. The book is written in an interesting style, and profusely and admirably illustrated. The illustrations of geological phenomena are taken from many parts of the earth, though as a book written in America for American students, the majority illustrate parts of the United States. A full index is appended.

"Life Histories of Familiar Plants." By J. J. Ward. 8vo., 204 pp. (Cassell, London, 1908.) 6*s*.

This is one of the now numerous books upon our native flowering plants, written with the object of interesting the unscientific observer in the common plants of field and forest. It deals in a popular way with the structure of the plants treated upon, and especially with their relation to their environment both animate and inanimate. In endeavouring to find an explanation of the form, arrangement and markings of different parts of plants, the author makes many ingenious suggestions, not all of them very convincing. It is a pity, too, to write as though the plants were sentient beings and are even able to convey messages to others of the species; as when, for instance, the first Oxalis found by folding its leaves at night it lost less heat (the suggestion the author makes as the result of the habit), "it forthwith conveyed the hint to the race." This is only one instance of many that occur.

The author ascribes sensitiveness to the root-cap—a structure composed of dead cells! (page 68). He says, too, that the cowslip is a plant of the low meadows, but surely it is also a plant of the hills; the slopes of the Pegsden Hills, for instance, are covered with cowslips, and so is many a railway embankment. His explanation of the difference in habit of flowering between the cowslip and the primrose seems of very doubtful value.

So long as the reader of books of this kind will exercise his critical faculties and will make observations as to the truth of statements for himself no great harm is done, but where children are concerned there is often a danger of imbibing theories as facts and finding it difficult later to correct them, so fixed do they become on the young mind. One could wish sometimes that authors would realize the impressiveness for many minds that still clings round the printed word, and would therefore, in their popular writings, be chary of advancing theories without carefully testing them from many points of view.

The illustrations, numbering 120, form a feature of the book and are good photographs well reproduced in half-tone. Most of them are worthy of praise, though figure 84 does not show the blotches on the Orchis leaves, which it is said to depict. Figure 93 appears to represent *Sedum spectabile*, not *S. Telephium*, as the name is given in the text.

"The Methods and Scope of Genetics." By W. Bateson, M.A., F.R.S. 8vo., 49 pp. (University Press, Cambridge, 1908.) 1*s*. 6*d*. net.

It was a happy idea of Professor Bateson to publish, for the benefit of the general public, the lecture which he delivered before the members of the University of Cambridge on the occasion of his inauguration as Professor of Biology in October last.

The purpose of the lecture is to describe, in a popular manner, the present outlook over the field of experimental research in the physiology of heredity and variation, a study which, owing to Mendel's wonderful discovery, has now developed into the definite and distinct science known as Genetics. As the author says, Mendelian discovery is leading us into a new world, the very existence of which was unsuspected before. He begins by pointing out the simple fact that each individual plant and animal has a double nature owing to its origin from two cells, one maternal and the other paternal. It is curious that the full consequences of this double nature seem to have struck nobody before Mendel. As Professor Bateson says: "In order to understand the significance of Mendelism, we must get thoroughly familiar with the fact that a man, a butterfly, and an apple-tree are not each one thing, but are each two things, double throughout every part of their composition. Consequently the contribution of the maternal and paternal gametes, or 'marrying' cells, may, in respect of any of the ingredients, be either the same or different. If they are the same the regulating organism is pure-bred for that ingredient; if different it is cross-bred."

Recent genetic research has led us to the further important conception that the individual is composed of what we call "presences" and "absences" of all the possible ingredients. This fruitful conception is the basis of all progress in genetic analysis. As to the nature of these ingredients or factors we at present know nothing, but it is interesting to note that Professor Bateson thinks that with the assistance of the physiological chemist, it cannot be very long before we know what some of these factors are.

Professor Bateson next deals with the phenomenon of segregation, and shows that where an individual is cross-bred for a certain ingredient, the germ-cells formed by such an individual alternately either contain or do not contain representatives of that ingredient. In Professor Bateson's own words: "If *both* the parent-gametes brought a certain quality in, then all the daughter-gametes have it. If it came in from one side and not from the other, then on an average, in half the resulting gametes it will be present and from half it will be absent. This last phenomenon, which is called segregation, constitutes the essence of Mendel's discovery."

Professor Bateson modestly shows, in passing, how a little experiment of his with Sweet Peas clearly demonstrated the true nature of reversion and variation. Two well-grown dwarf races of Sweet Peas which breed true, the prostrate 'Cupid' and the half-dwarf 'Bush,' crossed together produced the ordinary 'Tall' Sweet Pea of full height. "The reversion occurs because the two factors that made the *height* of the old Sweet Pea again come together after being parted; and the variations by which each of the dwarfs came into existence must have taken place by the dropping out of one of these elements or of the other." Here it may be said that if the study of genetics had done nothing more than this, it would have fully justified its existence, after the many years of vague and futile discussions about reversion and variation since the time of Darwin. It is refreshing to find that a simple experiment with Sweet Peas in Mr. Bateson's garden at Grantchester should help to give us the solution of two profound problems which have exercised the greatest minds in all ages.

In justice to Professor Bateson it seems only fair to point out that though in his writings he modestly ascribes all his results to the work of Mendel, those of us who have had the good fortune to work with him know full well that there is much more than this behind it all. Mendel's work with culinary peas has undoubtedly been the basis of all recent genetic research, but had it not been for Professor Bateson's guiding hand, would the problems of reversion and variation have ever been solved? I think not.

Other interesting advances are noted in Professor Bateson's lecture, such as the presence of preventive factors, of superposed factors, of mutual repulsions and interactions between different factors, to say nothing of some stimulating suggestions on the probable Mendelian inheritance of sex in insects, birds and man. Last, but not least in importance, Professor Bateson alludes to the value of genetic inquiry to the study of evolution and to practical human affairs, and throws out some broad hints to those who are concerned with the problems of the origin of species and the betterment of the human race.

In short this admirable and indispensable little book, written by a master-hand, is essentially a popular work in the truest sense of the word, and must appeal to all sorts and conditions of readers, in spite of its somewhat technical title. It is a book which makes for progress, and a careful study of it is an absolute necessity to those who wish to be up-to-date in the new science.

"Through Southern Mexico: being an Account of the Travels of a Naturalist." By Dr. Hans Gadow. 8vo., 527 pp., 165 illustrations and maps. (Witherby, London, 1908). 18*s*. net.

This is an interesting record of the author's travels and exploration during some eight months in 1902 and 1904. There are plenty of travel incidents and adventures, which give a very clear and vivid idea of a country which is not often visited by English travellers. The special value of the book lies perhaps in the many details about the life and customs of frogs, tree-frogs, snakes, lizards, and the like, of which a great number were collected. There is, in particular, a very full history of the classical axolotl.

There is also a chapter on the ancient civilization in Mexico and its origin, which contains full details of the astronomy and calendars of the Aztecs or Toltecs. The customs and characteristics of the modern Indian inhabitants are often mentioned incidentally.

For botanical readers there is a full account of the cultivation of *Agave americana*, and of its use as pulque; such fruits as the Mexican banana, pineapple, alligator pear, mammee apple and the like, are fully described. The forests of Mexico are still by no means so thoroughly known as one would expect, and there are graphic sketches in many parts of the volume which are of interest.

The rain forest is fringed on its outskirts by an impenetrable wall of luxuriant herbage, shrubs and creepers, the *tout ensemble* recalling a lavishly arranged bank of flowers at a flower show. After hacking and slashing a path through the tangled growth, "we are in a gloomy, stuffy forest consisting of tall straight trees, which branch out at a great height above us, there interlacing and forming a dense canopy of green through which passes little or no sunlight." "From below the leaves, branches, and even bright coloured birds look black."

"If by a lucky chance, we obtain a bird's-eye view from some eminence we behold a different world. A dense green carpet overstrewn with thousands of mauve, pink, yellow, or white flowers of some kind of Bignonia, visited by countless butterflies which are preyed upon by lizards and tree-frogs, these being in their turn sought after by tree-snakes. Of bird life, gorgeous and beautiful in colour, there is plenty. Vividly coloured are also many of the other creatures—frogs, snakes, lizards, and butterflies. Colour has to be laid on vividly, quiet coloration being out of place. This colour-contrast was started by the blossoms, red, yellow, or white; self colours not variegated predominate and stand out very effectively against the green."

The very clear description of the Mexican forest does not, however, apply to all tropical forests, which may be exceedingly different even in one and the same district.

The author has also some very interesting notes as to the distribution of plants in the Nevado in which he appreciates the great importance of the cloud zone. There are also many other interesting observations on ants, birds, the Mexican slug, and other animals.

"Notes of a Botanist on the Amazon and Andes." By Richard Spruce, Ph.D. Edited by Alfred Russel Wallace, O.M., F.R.S. 8vo., 2 vols., 518 + 542 pp. 71 illustrations, 7 maps. (Macmillan, London. 1908.) 21*s.* net.

These notes form a rather miscellaneous collection made from note-books, journals and private letters during Spruce's long residence in South America from 1849–1864. But they also include several valuable Papers which were prepared by him for publication and which are to be found in the second volume.

Many of his adventures and experiences are most interesting, for he travelled in many dangerous and out-of-the-way places, and describes, with almost photographic accuracy, the ferocious insects, the flora, the particularly exasperating Indians and other inhabitants.

The scattered references to Orchids, Palms, Ferns, Bromeliads, Melastomaceae and other interesting flowers and trees are often valuable. He was an enthusiastic collector in a botanist's paradise and took every advantage of his opportunities. We must allude also to the full account of the rubber trees, and of the methods of preparation and collection, as well as to his painful and dangerous search for Cinchona seedlings and the successful transport of these specimens from their original home to the seaport from which they eventually reached British India, where their descendants are now flourishing. There are valuable accounts also of the narcotics and stimulants in common use amongst the Indians.

His sketch of the vegetation of the Amazon valley is exceedingly clear and compares favourably even with the recent descriptions of Dr. Ula. Indeed one is often apt to forget that these notes are forty years old, and one cannot help wishing that he had worked out several problems of which he evidently knew a great deal more than can be deduced from his rough notes.

The floating-islands of the Amazons, composed of grasses which are sometimes forty-five feet long, seem to resemble similar vegetations from the Nile and the Ganges. He has much of great interest to say also on the different forests in the Amazon's valley, which are very clearly distinguished and described.

There are all sorts of questions connected with anthropology, zoology, geology and meteorology, which are discussed in this work. There is, *e.g.*, a very full history of the Warrior-women or Amazons, of Valverde's still secret treasure-store, and of the picture writing of the Indians which is found etched on rocks at many points in the valley.

But the most interesting part of the volume refers to those ferocious ants which occupy, or perhaps we should say which dominate, the forests of Hylaea. Spruce does not exactly say that they form the ant-gardens by carrying seeds and earth to the forks of the branches, but he alludes to them and very likely did not care to set down what he thought. The Paper on ant-agency, which was written in 1869 and is now published for the first time, is, however, of the greatest scientific importance, and it should be carefully studied by every naturalist.

There is a certain Melastomaceous genus, *Tococa*, of which there are twenty-four or twenty-five species in the Amazons. One or two of these are entirely submerged in the annual inundations, and these have no ant-homes, but all the others, none of which are ever completely covered by the water, possess peculiar sac-like swellings between the vein-forkings. These are inhabited by ferocious ants which form an efficient bodyguard to the plant. So far as these observations go, they simply add to the already long list of ant-guarded plants. But Spruce in his original Paper states that he examined half-grown plants, and saw that the sacs begin to form long before any ants touch them and proceeds to draw the important conclusion that these swellings or sacs are inherited and are the result of long continued generations of ant-visitors.

It is a case very similar to the well-known acarodomatia or mite-homes common in the vein-forkings of the leaves of many British trees. With regard to these it has also been stated that they appear in a rudimentary state before the mites reach them. Readers of this Journal will also recall Professor Henslow's well-known theory that flower nectaries owe their origin to the probing and tearing of insects seeking pollen or honey.

Unfortunately for Spruce, and also for science, it was then supposed that acquired characters could never be inherited, especially if they were of the nature of mutilations.

In consequence, this valuable Paper has been held back for forty years, and it is very likely that Spruce was so discouraged by its reception that he did not work out other interesting points. Dr. Wallace, so far as one can see, believes Spruce's observations to be correct, though without committing himself to the unpopular and heterodox view that acquired characters can be inherited.

The Paper may be taken as a valuable step in advance, for there are many instances, not only that of *Tococa*, of ant-agency.

But it is difficult not to feel disheartened and discouraged when one finds that orthodoxy in scientific matters still has such power to discredit and delay the obvious deductions of an experienced naturalist.

The publication of this valuable Paper in its original form should make this book necessary for the library of all interested in Darwinism.

"Elementary Botany." By E. Drabble, D.Sc., F.L.S. 8vo., 234 pp. 76 figures. (Edward Arnold, London, 1908.) 2*s.* 6*d.*

This small text-book of elementary botany has been written for those preparing for examinations requiring but an elementary knowledge of the science, a broad general idea of the fundamental principles in the life of flowering plants, without entering into the minute histological details which entail the use of a microscope. The first 180 pages are devoted to these principles and a simple description of the modifications of the organs of plants, and the student is encouraged to conduct experiments with simple apparatus, taking nothing for granted, but demonstrating for himself the truth of all assertions laid down. About thirty pages are given to a general outline of classification, a summary being given of the broader characteristics of the more important genera in those natural orders which are usually included in an elementary syllabus. The numerous figures are of a somewhat simple character, but sufficiently serve their purpose for illustrating the text. This will prove a very useful little book to put into the hands of a beginner in the study of Botany.

"Roses and Rose Growing." By Rose G. Kingsley. 8vo., 163 pp. (Whittaker, London, 1908.) 6*s.* net.

Notwithstanding the number of books dealing with Roses and Rose culture which have appeared in recent years, the present volume fills quite a distinct place of its own. For it is written by an amateur of considerable experience, in the interest of that numerous class of Rose growers who, like the writer herself, tend their Roses themselves, and to whom the exhibition tent offers no attractions whatever. Then again, the directions and descriptions are so clearly and graphically given, and with such enthusiasm, that they cannot fail to interest those who have as yet given but little attention to the subjects of which they treat. The early chapters are devoted to such cultural questions as planting, pruning, propagating, &c., while the greater part of the work deals in an interesting manner with the various classes into which cultivated Roses are divided, and the purposes for which they are best adapted—with lists appended of the principal varieties in each. At the end is a short chapter by the Rev. F. Page-Roberts, President of the National Rose Society, himself an experienced exhibitor, on how to grow Roses for exhibition. In no other part of the volume, however, is the question of Rose-growing treated in any but from a garden point of view. No notice of this Rose book would be complete without special mention of the illustrations, and more particularly the coloured portraits of Roses, which are among the most faithful and pleasing that have yet appeared.

"The Nature of Enzyme Action." By W. M. Bayliss, D.Sc. F.R.S. 8vo., 90 pp. (Longmans, London, 1908.) 3*s.* net.

A highly technical monograph on a section of Biochemistry. It is based upon lectures given at various times in University College, London. The general properties more or less common to enzymes are discussed in such a manner that only the earnest and somewhat advanced student can sufficiently appreciate.

A long list of literature which has more or less direct bearing on the subject, and which is to some extent referred to in the text, is given at the end. There is also a good index.

"Soils and Fertilizers." By H. Snyder. 3rd ed. 350 pp. (Macmillan, New York and London, 1908.) 5*s.* net.

A very useful book by a well-known and painstaking author. Beginning with the physical properties of soils, it proceeds to deal with their formation, classification and chemical composition. Soil nitrogen takes up some forty pages. Organic manures and the various fertilizers are dealt with in a style which most readers will duly appreciate. Food requirements and rotation of crops receive careful attention. Tillage operations are enlarged upon in a manner which shows a master's hand, and the reader will probably wish this section was more detailed. The work contains a chapter on Laboratory practice.

"The Soil: an Introduction to the Scientific Study of the growth of crops." By A. D. Hall, M.A. 2nd ed. 311 pp. (Murray, London, 1908.) 5*s.* net.

A second edition of a well-known book, and one recommended by the R.H.S. for students. There are several additions and alterations in this edition. The author states he has greatly modified the views he expressed in the first edition on the nature of clay and on the part played by zeolitic silicates in the retention of ammonium and other salts by the soil. He draws attention to the great additions made to our knowledge of the work of bacteria in the soil and the information has accordingly been brought much more up-to-date in this respect.

The author writes as a scientist and as a teacher, and he is both these of the first water, but he falls into one very serious error. He writes: "There is every probability that the individual farmer will be as often misled as guided by the results of his own experiments. The design and conduct of field experiments must be left to the expert." He will find few to agree with him.

"The Standard Cyclopedia of Modern Agriculture and Rural Economy." By many Authors; edited by Professor R. Patrick Wright. 8vo., vols I. and II. each 240 pp. and many plates and figures. (The Gresham Publishing Company, London, 1908.) 8*s.* net each vol.

This work, which is to be completed in 12 vols., aims at being an exhaustive treatise on all that appertains to Agriculture, including Horticulture. The contributors are for the most part the best recognized authorities on the subjects dealt with, It would be a bold critic who could venture to question the soundness of the majority of the articles, although before the publication of the entire work is completed we doubt not some of the statements will have been proved to be exploded errors.

Vol. I. contains a very valuable anatomical model of the cow.

The subjects dealt with are so diverse that without an index it is difficult to find what one requires. Even then the matter is much broken up, probably necessarily so for alphabetical arrangement. The value of the work will very greatly depend upon the index.

"Gardens of England." Painted by Beatrice Parsons, and described by E. T. Cook. 8vo., 199 pp. (Black, London, 1908.) 7*s.* 6*d.*

A charmingly written and beautifully printed and illustrated book which we think would be of more value if an index were appended. About twenty garden scenes are well illustrated in colours, and as in many places similar effects could easily be produced, this work will commend itself to owners of large gardens who may be contemplating alterations or improvements, or making new gardens. The descriptive matter relating to the illustrations contains a mass of information on how and when to plant the various plants figured, and many excellent suggestions are given on desirable plants to grow.

"English Houses and Gardens in the seventeenth and eighteenth centuries." Reproduced from contemporory engravings by Kip, Badeslade, Harris, and others. Obl. 4to., 36 pp. 61 plates. (Batsford, London, 1908.) 15*s.* net.

This is not only a most interesting book, but its quaint plates are very instructive in showing the strictly formal style of gardening in vogue during the period mentioned in the title. There are sixty-one plates showing many well-known noblemen's and gentlemen's seats: few if any of them would be recognized at the present day. A more natural and beautiful type of gardening has replaced the original stiff plans, but in some of the places mentioned and illustrated that we have visited, there are still the magnificent avenues planted in those days, giving an appearance which excites the envy and admiration of all who do not possess such a noble feature on their own estates. Almost all the buildings and gardens depicted in the plates were made between the years 1550 and 1720; symmetry of design being the prevailing feature of the house, buildings and gardens, and one cannot fail to admire the exceeding care to have everything exactly balanced. Clipped hedges, parterres with box edging, and bowling greens, are much in evidence in some of the engravings, and terraces are seen in almost all, proving that expense was not spared. The book is of a convenient size, well-printed, pleasingly bound. The pages are not all numbered, but the plates are, and are easily found.

"Mushrooms. How to grow them." By William Falconer. 8vo., 169 pp. (Kegan Paul, London, 1907.) 5*s*.

Although this work was written in America for American readers principally, there is much that is of interest and value to European readers, in fact, many extracts are from books and papers published in Britain on mushroom culture. While endorsing nearly all the information and advice so ably put before us, we must disagree with the author when he says "that the manure from carrot-fed horses is good, and anyone having plenty of it can also have plenty of mushrooms." He freely admits that it is not so good as manure from horses not root fed; and our experience, and that of many others who have grown mushrooms, is that no satisfactory crop of mushrooms can be grown from manure where the horses are daily supplied with roots or where they are physicked to keep them in condition. With the above exception we cordially agree with all the practical author has written, and can recommend the book to all interested in mushroom cultivation. The work is well printed, nicely illustrated, and well bound.

"Children and Gardens." By Gertrude Jekyll. 8vo. 110 pp. (Country Life, London, 1908.) 6*s*. net.

A charmingly written book with beautiful illustrations, and with the innumerable books on gardening there is still room for this. Nothing is better for children than gardening, and the authoress tells how the love of gardening may be fostered amongst children from her own experience. Many children have been given pieces of barren or rough ground to make a garden, and the work has become so irksome that in a short time they have detested it, and cared very little about a garden ever after, but given a nice little garden already made, the conditions are totally different. All this and much more is fully treated upon by the author, and is well worth reading by all who have children and a garden. The only thing we object to in the book is the praise accorded to cats in the garden; they are nearly as bad as the proverbial bull in a china shop, doing almost as much damage.

BRUSSELS SPROUTS AT WISLEY, 1908–09.

Thirty-two stocks of Brussels Sprouts were received for trial, all of which, except those received late, were sown on March 21. When large enough the plants were put out at 3 feet apart each way, on land that had been deeply dug and moderately manured. All germinated well, and made excellent growth, but the very hot weather in October caused nearly all the "buttons" to become open and loose. Mild weather generally continued to the end of December 1908, when severe weather suddenly set in, the thermometer falling to zero, practically destroying the whole crop.

List of Varieties.*

1. Covent Garden Favourite.
2. De la Halle.
3. French Dwarf Improved.
4. French Solid Sprout.
5. Improved Erfurt.
6. Little Gem.
7. Paris Market.
8. Perfection.
9. President Carnot.
10. Scrymger's Giant.
11. Semi-dwarf Dutch.
12. Standard.
13. Tall Improved.
14. The Wroxton.
15. Cambridgeshire Champion.
16. Paris Market.
17. Scrymger's Giant.
18. Half-dwarf Paris Market.
19. Dwarf Gem.
20. Exhibition.
21. Standard.
22. Exhibition.
23. Darlington.
24. Selected.
25. Model.
26. Little Gem.
27. Skrobeck Favourite.
28. One and All.
29. St. Martha.
30. Danish Prize.
31. Eiffel Tower.
32. Superlative.

15. Cambridgeshire Champion (J. Veitch).—Stock not fixed, and requires further selection.

1. Covent Garden Favourite (Barr).—Growth moderate, irregular in habit; medium-sized foliage; sprouts large and firm. Stock requires a little more selection.

30. Danish Prize (Burpee).—A very tall grower with large foliage; sprouts small, open, and grown out.

23. Darlington (Kent & Brydon).—Growth dwarf, compact; moderate foliage; sprouts large, firm, and stood well. One of the best.

2. De la Halle (Barr).—Growth moderate; even habit; medium foliage; sprouts large, firm, loosely placed. A very late variety.

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* All trials in the Wisley Garden are carried out under number only until judging is completed. The number prefixed to the name of the variety in the Report corresponds with that by which alone the variety was known until judgment had been given. Fellows visiting the Garden and noticing any plant under a number can easily ascertain its name later by reference to the Report in the Journal.

19. Dwarf Gem (Sutton).—Growth dwarf, habit compact; foliage small; sprouts small and firm. This variety occupies less space than other varieties.

31. Eiffel Tower (Gray).—A very tall, robust grower, and requires further selection.

20, 22. Exhibition (Sutton, Sharpe).—Moderate grower, good habit; foliage rather large; sprouts large and fairly firm.

3. French Dwarf Improved (Barr).—Growth very dwarf; even, compact habit; foliage medium and in a thick cluster on the head; sprouts small and thickly placed. A good variety.

4. French Solid Sprout (Barr).—Growth tall and irregular; foliage large; sprouts small and thinly placed, quickly become loose.

18. Half-Dwarf Paris Market (Vilmorin).—Growth dwarf; moderate foliage; sprouts small, very firm; kept in good condition longer than other varieties.

5. Improved Erfurt (Barr).—Growth dwarf, habit compact; small foliage; sprouts small and poor; rotted quickly.

6, 26. Little Gem (Barr, Sydenham).—Growth dwarf, good habit; moderate foliage; sprouts very small, but firm and standing fairly well.

25. Model (Bunyard).—A very tall grower, and not a success at Wisley.

28. One and All (Heinemann).—Requires further selection.

7, 16. Paris Market (J. Veitch, Barr).—Medium growth; foliage very dark and distinct; habit regular and compact; sprouts small, clean, and firm.

8. Perfection (Barr).—Growth dwarf, but sprouts too poor for description.

9. President Carnot (Barr).—Growth moderate, fairly compact; foliage of medium size; sprouts large and firm.

10, 17. Scrymger's Giant (Barr, J. Veitch).—Growth rather large; habit regular; sprouts large, but loose, and suffered severely from frost.

24. Selected (Dobbie).—Growth tall and robust; moderate foliage regular; sprouts large, but grew out quickly.

11. Semi-dwarf Dutch (Barr).—Growth dwarf; foliage and habit very compact; sprouts so very small as not to be worth describing.

27. Skrobeck Favourite (Johnson).—Growth moderate; good compact habit and foliage; sprouts small, and grew out quickly.

12, 21. Standard (Barr, Sharpe).—Growth tall; good regular habit; foliage moderate; sprouts loose and open.

29. St. Martha (Staward).—Stock mixed.

32. Superlative (Wallace).—Stock not fixed; red foliage.

13. Tall Imported (Barr).—Tall, straggling grower, and requires more selection.

14. The Wroxton (Barr).—Growth dwarf, compact, sturdy; foliage moderate; sprouts of medium size, firm. A good late variety.

PARSLEY AT WISLEY, 1908-09.

Thirty-seven stocks of Parsley were received for trial, all of which were sown on April 2, on soil that had been deeply dug and well manured, the rows being 18 inches apart, and the plants thinned out later to one foot apart in the rows. All the stocks germinated well, and the growth made was excellent. All the stocks stood the trying winter very well, Nos. 3, 4, 5, 11, and 32 standing particularly well. The Fruit and Vegetable Committee examined the collection on two occasions.

List of Varieties.[*]

1. Beauty of the Parterre.
2. Champion Moss-curled.
3. Covent Garden.
4. Crested Bouquet.
5. Dwarf Perfection.
6. Emerald Green.
7. Extra Double-curled.
8. Fern-leaved.
9. Giant Curled.
10. Large Curled.
11. Myatt's Garnishing.
12. Perpetual.
13. Plain or Sheep's Parsley.
14. Triple Curled.
15. Myatt's Garnishing.
16. Imperial Curled.
17. Garnishing.
18. Dwarf Perfection.
19. Champion Moss-curled.
20. Exhibition.
21. Fern-leaved.
22. Fern-leaved.
23. Hamburgh or Turnip-rooted.
24. Myatt's Extra-fine Garnishing.
25. Perennial.
26. Perfection Moss-curled.
27. Exhibition.
28. Perfection.
29. Moss-Curled.
30. Mossy-curled.
31. Brookland's Exhibition.
32. Exquisite curled.
33. Dwarf Perfection.
34. Extra Curled.
35. Champion Moss-curled.
36. Fern-leaved.
37. Extra Curled.

F.C.C. = First-class Certificate.
A.M. = Award of Merit.

1. Beauty of the Parterre, **A.M.** August 25, 1908 (Carter).—Growth tall, strong, and vigorous; leaves large, branched, and well curled.

31. Brookland's Exhibition (Deal).—Very similar to No. 1, but the leaves not so branching.

2, 19, 35. Champion Moss-curled (Dobbie, Carter, Vilmorin).—Growth tall, strong, vigorous; leaves large, branched, beautifully curled; very dark green colour.

3. Covent Garden, **F.C.C.** August 30, 1870 (Carter).—Growth flattish and very spreading, vigorous; fronds large, branched, well curled; pale green in colour.

4. Crested Bouquet (Carter).—Growth rather tall and spreading; leaves much branched, densely curled; light green in colour.

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[*] See footnote p. 88.

5, 18, 33. Dwarf Perfection, **A.M.** July 31, 1908 (Sutton, Carter, Massey).—Growth dwarf, vigorous, spreading; leaves branched and tightly curled. A beautiful variety for garnishing.

6. Emerald Green, **A.M.** August 25, 1908 (Carter).—A densely curled form of No. 3.

20, 27. Exhibition (Bunyard, Dobbie).—Growth rather tall, compact; leaves of medium size, well curled; dark green colour.

32. Exquisite Curled (Kent & Brydon).—Growth tall, vigorous, spreading; leaves branched and semi-fern-leaved.

34, 37. Extra Curled (Staward, Harris).—Growth dwarf and compact, strong; leaves of medium size and well curled.

7. Extra Double-curled, **A.M.** August 25, 1908 (Carter).—A good form of No. 3.

8, 21, 22, 36. Fern-leaved (Barr, Carter, Dobbie, Vilmorin).—Growth tall, vigorous, branching, fern-like; light green colour.

17. Garnishing, **A.M.** August 25, 1908 (Sutton).—Growth tall and vigorous; leaves much divided, almost like Fennel; light green, very distinct.

9. Giant Curled (Carter).—Growth tall and vigorous; large spreading leaves, moderately curled.

23. Hamburgh or Turnip-rooted (Barr).—This is best known as "Sheep's Parsley," and is largely grown in Australia for sheep, as it is very productive, but of little value for garden purposes.

16. Imperial Curled (Sutton).—A vigorous form of No. 15.

10. Large Curled Branching (Carter).—Very similar to No. 15.

29. Moss-curled, **A.M.** August 25, 1908 (Nutting).—Growth rather tall and branching, vigorous; leaves large and well curled; light green colour.

30. Mossy Curled (Sydenham).—Growth medium, branching, vigorous, nicely curled; darkish green.

11, 15. Myatt's Garnishing (J. Veitch, Carter).—Growth rather tall, vigorous, branching; leaves large and moderately curled; rather light green.

24. Myatt's Extra-fine Garnishing, **A.M.** August 25, 1908 (Barr).—A very fine and beautifully curled form of No. 15.

25. Perennial (Barr).—A very good well-curled variety, but requires more selection.

28. Perfection, **A.M.** August 25, 1908 (Johnson).—Growth rather dwarf, branching, vigorous, and yet compact; close fern-leaved; pale green, handsome.

26. Perfection Moss-curled (Barr).—Growth tall and straggling, coarse, and not well curled.

12. Perpetual (Carter).—Growth dwarf, compact; leaves well curled. Requires a little more selection.

13. Plain or Sheep's Parsley (Carter).—See 'Hamburgh.'

14. Triple Curled (J. Veitch).—Growth moderate, branching, vigorous; leaves fairly well curled; pale green.

EXAMINATION OF EMPLOYEES IN PUBLIC PARKS.

JANUARY 11th, 1909.

THE Royal Horticultural Society's fourth Examination of the Employees in Public Parks was held on January 11, 1909.

As previously, the Examination was partly *viva voce* and partly written, occupying three hours and twenty minutes. It was held at the Society's Hall in Vincent Square, Westminster.

One hundred and nineteen candidates entered, and of these twenty-five secured places in the first class, forty in the second, and thirty-seven in the third, leaving seventeen candidates who failed to obtain the minimum marks required. No one candidate stands out prominently before the others, and the highest marks obtained fall considerably below those of 1908. It is encouraging, however, to notice that in Class I about fifty per cent. of the candidates were in the lower Classes last year, and other candidates of former years, if not yet in Class I, have attained a higher position than formerly. So much for the value of perseverance.

The answers to the questions indicated a very fair acquaintance with the practical work of draining, trenching, manuring, soil preparation for planting, and the general cultivation of the soil. It is on questions involving thoughtful study, observation and resource that many candidates show much weakness. To attain a certain versatility of ability to deal with all aspects of the work of a public garden is a matter requiring thought and observation. The lack of these was evident in answers to Questions 5 and 13. The former merely required the expression of a few graceful curves—but many of the answers revealed the crudest lines and most inartistic ideas; and the few attempts made to answer Question 13 may be supposed to indicate a lack of knowledge of the financial side of a public garden. A marvellous deficiency in arithmetic was exposed, only four correct answers being given to '13 (3)' which any boy in Standard IV at school might easily have answered. With reference to the classification and naming of trees and shrubs, the majority of the candidates were familiar with the common name of many, but were unable to give their generic or specific names. Their native countries also were but weakly known, and as to those which are distinctly 'British' a general haziness of mind existed, the majority of candidates including N. American, Japanese, and New Zealand trees and shrubs as British. The scientific names and the natural habitat of the trees and shrubs of our public gardens would repay a closer study, for nothing interests the public more than to find these points well and correctly set out.

An immense improvement is noticed in the understanding of the cultivation of flowering shrubs, indicated by the answers to Question 12, as compared with two years ago, when a similar question was given.

Reviewing the results generally:—There is still much room for improvement, the higher standard hoped for in last year's report having to be still held in anticipation. A completer knowledge of garden practice and the reasons for it ; the values of phosphatic and nitrogenous manures, their comparative cost, and the quantities required ; the art of curves and the power to express them neatly on paper ; arithmetical calculations for land measures and simple cash computations—such things as these, added to a more intensive knowledge of gardening specialized for public parks, are necessary to raise the employees to the standard of really first-class craftsmen whose skill is to find expression in the gardens which they serve.

The higher places gained by most of the old candidates in the lists should be an encouragement to the less successful to persevere diligently with their work and try again next year.

It should perhaps be put on record that there is absolutely no difference of merit whatsoever in being placed in Division A or in Division B. A first Class in one is as good as a first Class in the other. The two Divisions are only kept up for the convenience of certain public authorities.

C. R. FIELDER,
OWEN THOMAS,
JOHN W. ODELL,
W. CRUMP,
EDWARD WHITE,
W. WILKS,
} *Examiners.*

DIVISION A.

Class I.

1. Gibson, E., Clissold Park Lodge.
2. Western, Jos., Island Gardens, Poplar.
3. Pogmore, C., 7 Anerley Vale, Upper Norwood.
4. Parish, Henry Geo., 39 Canterbury Grove, West Norwood.

Class II.

1. Brice, John Gordon, 14 Constantine Road, Hampstead.
2. Drage, Edward, Harford Street, Mile End.
3. Marshall, Charles, Avery Hill, Eltham.
4. Hodge, William Albert, White Lodge, Victoria Park.
5. Faulkner, Frank, 54 Hargrave Park, Upper Holloway.
6. Philpott, Ernest Victor, 59A Emu Road, Battersea.

Class III.

1. Hurley, James, 141 Trundley's Road, Deptford.
2. Collop, Thomas, 29 Saltwood Grove, Walworth.
3. Scrase, Edward, 68 Idmiston Road, Stratford.
4. Chapman, John, 41 Finland Road, Brockley.
5. Lambourne, C., 72 Clive Road, Dulwich, S.E.
6. Gray, William John, 24 New Church Road, Camberwell.

DIVISION B.

Class I.

1. Mayhew, Charles Watts, 11 Claribel Road, N. Brixton.
2. Butcher, Percy George, 2 Luxford Street, Rotherhithe.
3. Troke, Andrew J., 7 Crewys Road, Child's Hill.
4. Free, M., 5 Mortlake Terrace, Kew.
5. Dixon, Frederick Charles, 2 Hawthorn Grove, New Eltham.
6. Waldon, W., 172 Belgrave Road, Walthamstow.
7. Hartless, Alfred Jas., 40 Bismarck Road, Highgate Hill.
8. Harding, Cyril, 10 Fairoak Road, Cathays, Cardiff.
9. Poate, H. J., 22 Terront Road, West Green, Tottenham.
10. Kett, Robert, 87 Ashleigh Road, Mortlake.
Oliver, G. H., 5 Mortlake Terrace, Kew.
12. Lambert, Thomas, 4 Christie Road, South Hackney.
Jennings, H. C., 66 Sharlestone Road, West Norwood.
14. Richardson, John, 21 Alexandra Road, Richmond.
Butler, H., 6 Brettenham Road, Walthamstow.
16. Richards, William Jno. J., 125 Rotherhithe New Road, Rotherhithe.
Middlemiss, Thos. Jas., 51 Clement's Road, Bermondsey.
Wiley, Henry Alfred, 67 Granleigh Road, Leytonstone, E.
19. Lewis, J. W., 10 Dairsie Road, Eltham.
Newton, Walter E., 307 Southwark Park Road, Bermondsey.
21. Avery, J. W., 15 Pevensey Road, Tooting.

Class II.

1. Webb, Herbert Wm., 49 Vespan Road, Shepherd's Bush.
2. Beale, Jas. H., 2 Watcombe Cottages, Kew.
3. Scott, John, 36 Alexandra Road, Richmond.
White, James C., 11 Cornflower Terrace, East Dulwich.
5. Coffey, Daniel James, 6 Halons Road, Eltham.
Oldham, C. H., 35 Gloucester Road, Kew.
7. Fisher, Walter, 3 Shafton Road, South Hackney.
Ottaway, G., 128 Dartmouth Park Hill, N.
Weston, Robert Jas., 11 Finland Road, Brockley.
10. Barrance, Francis, 3 Glen Cottage, Eltham.
11. Ringe, James, 5A Winders Road, Battersea.
Barrett, Frederick Wm., 10 Oaksford Avenue, Sydenham.
13. Chamberlain, Arthur G., 22 Fairoak Road, Cathays, Cardiff.
14. Walkden, Chas. Henry, 14 Heather Road, Grove Park.
15. Chipperfield, Alfred, 1 Moreton Terrace, Rotherhithe.
Money, E. G., 6 Oxford Road, Upper Norwood.
17. Prow, Chas. Wm., 8 Clandon Street, St. Johns.
18. McKinley, D. F., 342 Kew Road, Kew.
Anderson, James, 22 Carnac Street, West Norwood.
20. Headington, W. G., 40 Bullen Street, Battersea.
Salway, Walter Morris, 60 Lulot Road, Highgate.
22. Thompson, A. W., Golder's Hill, Hampstead.

23. Morris, Albert E., 68 Coventry Street, Bethnal Green.
Eeles, Frank, 18 Regent Street, Blackheath Hill.
25. White, Henry Geo., 8 Albion Gardens, Hammersmith.
26. Martin, Edward, Crescent Road, New Barnet.
Hall, William Geo., 102 Sewardstone Road, Bethnal Green.
Bland, William, 7 Holmesdale Road, Highgate.
Syms, Henry Wm., Copper Mill Gate House, Walthamstow.
28. Cosham, Chas. I., 13 Brailsford Road, Tulse Hill.
Lee, Wm. Robert, 35 Davisville Road, Shepherd's Bush.
Vyse, John William, 2 Coombe Road, Upper Sydenham.
33. Wicks, Edwin Frank, 47 Paulet Road, Camberwell.
34. Wilson, Edward James, Waterlow Park, Highgate.

Class III.

1. Hurrell, Jim, 16 Jubilee Cottages, Eltham.
2. Sirett, Frederick W. G., 13F Peabody Buildings, Herne Hill.
3. Love, Fredk. Chas., 11 Fergusson Road, East Barnet.
4. Featherstone, Ernest, 62 Strahan Road, Bow.
MacConachie, Jos. S., 2A Scawen Road, Deptford.
5. Power, W., 152 Old Ford Road, Victoria Park.
Salvage, Bertram H., 308 Kew Road, Kew.
Williams, Fredk., 11 Royal Street, Lambeth.
8. Holder, Philip E., 49 Durham Road, West Green.
Andrews, Samuel, 110 Dartmouth Park Hill, Highgate.
11. Duncan, Geo., 31 Rowland Grove, Upper Sydenham.
Ashmore, Sydney, 30 Balham Road, Lower Edmonton.
13. Knowles, Frank H., 8 Albion Gardens, Hammersmith.
Smith, Robert, 42 Dumont Road, Stoke Newington.
15. White, Wm. Jas., 56 Branksome Road, Brixton.
Ottley, Geo., 103 Cheddington Road, Upper Edmonton.
16. Allen, Thos., 17 Ruskin Street, Battersea.
Butler, Edwin Arthur, 57 Sewardstone Road, Bethnal Green.
Bennett, Frank, 116 Beresford Road, Harringay.
19. Musk, W., 11 Lavers Road, Stoke Newington.
Easter, Geo., 14 Highbury Terrace, Highbury.
Monkelow, F., 4 Power Street, Battersea.
Jones, Edward, 120A Wycliffe Road, Lavender Hill.
22. Cole, Chas., 89 Candahar Road, Battersea.
Peck, Chas. R. Y., 2 Bengeworth Road, Camberwell.
26. Copeland, J. H., 223 Underhill Road, East Dulwich.
27. Morley, Alfred, 41 Birstall Road, South Tottenham.
28. Jepps, John, 128 Dartmouth Park Hill, Upper Holloway.
Maythorn, R. F., 8 Christie Road, South Hackney.
30. Herne, Henry, 171 Railton Road, Herne Hill.
31. Vale, Joseph, 62 Dumont Road, Stoke Newington.

NOTES ON RECENT RESEARCH

AND

SHORT ABSTRACTS FROM CURRENT PERIODICAL LITERATURE, BRITISH AND FOREIGN,

AFFECTING

HORTICULTURE & HORTICULTURAL SCIENCE.

JUDGING by the number of appreciative letters received, the endeavour commenced in volume xxvi. to enlarge the usefulness of the Society's Journal, by giving an abstract of current Horticultural periodical literature, has met with success. It has certainly entailed vastly more labour than was anticipated, and should therefore make the Fellows' thanks to those who have helped in the work all the more hearty.

There are still, we feel, some departments of Horticulture and Horticultural Science very imperfectly represented in these abstracts, and the Editor would be grateful if any who have time at command, and who are willing to help in any special direction in this work, would communicate with him. He desires to express his most grateful thanks to all who co-operate in the work, and he ventures to express the hope that they will all strictly adhere to the general order and scheme of working, as the observance of an identical *order* can alone enable the Editor to continue to cope with the work. The order agreed on is as follows :—

1. To place first the name of the plant, disease, pest, &c., being noticed ; and in this, the prominent governing or index word should always have precedence.
2. To place next the name, when given, of the author of the original article.
3. Then, the abbreviated form of the name of the journal, &c., in which the original article appears, taking care to use the abbreviation which will be found on pp. 264, 265.
4. After this, a reference to the number, date, and page of the journal in question.
5. If an illustration be given, to note the fact next, as " fig.," " tab.,' or " plate."

6. After these preliminary necessities for making reference to the original possible for the reader, the abstract or digest should follow, ending up with the initials of the contributor affixed at the close of each Abstract or Note.

NAMES OF THOSE WHO HAVE KINDLY CONSENTED TO HELP IN THIS WORK.

Baker, F. J., A.R.C.S., F.R.H.S.
Boulger, Professor G. S., F.L.S., F.R.H.S.
Bowles, E. A., M.A., F.L.S., F.E.S., F.R.H.S.
Chapman, H., F.R.H.S.
Chittenden, F. J., F.L.S., F.R.H.S.
Cook, E. T., F.R.H.S.
Cooke, M. C., M.A., LL.D., A.L.S., F.R.H.S., V.M.H.
Cotton, A. D., F.L.S.
Darlington, H. R., F.R.H.S.
Druery, C. T., V.M.H., F.L.S., F.R.H.S.
Dykes, W. R., M.A., F.R.H.S.
Farmer, Professor J. B., M.A., D.Sc., F.R.H.S.
Goldring, W., F.R.H.S.
Groom, Professor Percy, M.A., D.Sc., F.L.S., F.R.H.S.
Hartog, Professor Marcus, D.Sc., M.A., F.L.S., F.R.H.S.
Henslow, Rev. Professor Geo., M.A., F.L.S., F.R.H.S., V.M.H.
Hodgson, M. L., F.R.H.S.
Hooper, Cecil H., M.R.A.C., F.R.H.S.
Houston, D., F.L.S., F.R.H.S.
Kent, A. H., A.L.S., F.R.H.S.
Long, C. H., F.R.H.S.
Massee, Geo., F.L.S., F.R.H.S., V.M.H.
Newstead, R., A.L.S., F.E.S., F.R.H.S.
Petts, Alger, F.R.H.S.
Rendle, A. B., M.A., D.Sc., F.L.S., F.R.S., F.R.H.S.
Reuthe, G., F.R.H.S.
Saunders, Geo. S., F.L.S., F.E.S., F.R.H.S.
Scott-Elliot, G. F., M.A., B.Sc., F.L.S., F.R.H.S., F.R.G.S.
Smith, William G., B.Sc., Ph.D., F.R.H.S.
Veitch, Harry J., F.L.S., F.Z.S., F.R.H.S.
Voss, W. A., F.C.S., F.R.H.S.
Webster, A. D., F.R.H.S.
Welby, F. A., F.R.H.S.
Williams, S. E., F.R.H.S.
Wilson, Gurney, F.L.S., F.R.H.S.

JOURNALS, BULLETINS, AND REPORTS

from which Abstracts are made, with the abbreviations used for their titles.

Journals, &c.	Abbreviated title.
Agricultural Gazette of New South Wales	Agr. Gaz. N.S.W.
Agricult. Journal, Cape of Good Hope	Agr. Jour. Cape G.H.
Annales Agronomiques	Ann. Ag.
Annales de la Soc. d'Hort. et d'Hist. Naturelle de l'Hérault	Ann. Soc. Hé.
Annales de la Soc. Nantaise des Amis de l'Hort.	Ann. Soc. Nant. des Amis Hort.
Annales des Sciences Naturelles	Ann. Sc. Nat.
Annales du Jard. Bot. de Buitenzorg	Ann. Jard. Bot. Buit.
Annals of Botany	Ann. Bot.
Beiheft zum Botanischen Centralblatt	Beih. Bot. Cent.
Boletim da Real Sociedade Nacional de Horticultura	Bol. R. Soc. Nac. Hort.
Boletim da Sociedade Broteriana	Bol. Soc. Brot.
Botanical Gazette	Bot. Gaz.
Botanical Magazine	Bot. Mag.
Bulletin de la Société Botanique de France	Bull. Soc. Bot. Fr.
Bulletin de la Soc. Hort. de Loiret	Bull. Soc. Hort. Loiret.
Bulletin de la Soc. Mycologique de France	Bull. Soc. Myc. Fr.
Bulletin Department of Agricult. Brisbane	Bull. Dep. Agr. Bris.
Bulletin Department of Agricult. Melbourne	Bull. Dep. Agr. Melb.
Bulletin of the Botanical Department, Jamaica	Bull. Bot. Dep. Jam.
Bulletin of Bot. Dep. Trinidad	Bull. Bot. Dep. Trin.
Bulletino della R. Società Toscana d' Orticultura	Bull. R. Soc. Tosc. Ort.
Canadian Reports, Guelph and Ontario Stations	Can. Rep. G. & O. Stat.
Centralblatt für Bacteriologie	Cent. f. Bact.
Chronique Orchidéenne	Chron. Orch.
Comptes Rendus	Comp. Rend.
Department of Agriculture, Victoria	Dep. Agr. Vict.
Department of Agriculture Reports, New Zealand	Dep. Agr. N.Z.
Dictionnaire Iconographique des Orchidées	Dict. Icon. Orch.
Die Gartenwelt	Die Gart.
Engler's Botanische Jahrbücher	Eng. Bot. Jah.
Gardeners' Chronicle	Gard. Chron.
Gardeners' Magazine	Gard. Mag.
Gartenflora	Gartenflora.
Journal de la Société Nationale d'Horticulture de France	Jour. Soc. Nat. Hort. Fr.
Journal Dep. Agricult. Victoria	Jour. Dep. Agr. Vict.
Journal Imperial Department Agriculture, West Indies	Jour. Imp. Dep. Agr. W.I.
Journal of Botany	Jour. Bot.
Journal of Chemical Society	Jour. Chem. Soc.
Journal of Economic Biology	Jour. Econ. Biol.
Journal of Economic Entomology	Jour. Econ. Entom.
Journal of Horticulture	Jour. Hort.
Journal of the Board of Agriculture	Jour. Bd. Agr.
Journal of the Linnean Society	Jour. Linn. Soc.
Journal of the Royal Agricultural Society	Jour. R.A.S.
Journal S.E. Agricultural College, Wye	Jour. S.E. Agr. Coll.
Kaiserliche Gesundheitsamte	Kais. Ges.
Le Jardin	Le Jard.
Lebensgeschichte der Blutenpflanzen Mitteleuropas	Lebens. d. Blutenpfl.
Naturwiss. Zeitschrift Land und Forst	Nat. Zeit. Land-Forst.
Notizblatt des Königl. Bot. Gart. und Museums zu Berlin	Not. König. Bot. Berlin.
Orchid Review	Orch. Rev.
Orchis	Orchis.
Proceedings of the American Pomological Society	Am. Pom. Soc.

Journals, &c.	Abbreviated title.
Queensland Agricultural Journal	Qu. Agr. Journ.
Reports of the Missouri Botanical Garden	Rep. Miss. Bot. Gard.
Revue de l'Horticulture Belge	Rev. Hort. Belge.
Revue générale de Botanique	Rev. gén. Bot.
Revue Horticole	Rev. Hort.
The Garden	Garden.
Transactions Bot. Soc. Edinburgh	Trans. Bot. Soc. Edin.
Transactions of the British Mycological Soc.	Trans. Brit. Myc. Soc.
Transactions of the Massachusetts Hort. Soc.	Trans. Mass. Hort. Soc.
U.S.A. Department of Agriculture, Bulletins	U.S.A. Dep. Agr.*
U.S.A. Experimental Station Reports	U.S.A. Exp. Stn.†
U.S.A. Horticultural Societies' publications	U.S.A. Hort. Soc.†
U.S.A. State Boards of Agriculture and Horticulture	U.S.A. St. Bd.†
Woburn Experiment Farm Report	Woburn.

* The divisions in which the U.S.A. Government publish Bulletins will be added when necessary.

† The name of the Station or State will in each case be added in full or in its abbreviated form.

NOTES AND ABSTRACTS.

Aloe dichotoma. By Leonhard Lindinger (*Beih. Bot. Centralbl.* xxiv., Erste Abth., Heft 2, pp. 211–253; with 4 plates).—A particularly fine specimen of this species having succumbed to disease in the Hamburg botanical garden, the author was enabled to make a thorough microscopic examination of its anatomical structure.

The branching is not truly dichotomous, for remains of a terminal flower axis can be found in the forks. The number of branches is not more than two or at most three. Axillary buds are not produced regularly.

The plant shows distinct adaptation to resist extraordinarily dry conditions of atmosphere, but in the author's opinion (contrary to that expressed by Schenck) it obtains water from the soil by means of its roots. As the upper layers of the soil are often dried up and strongly heated by the sun's rays, the upper part of the root is provided with a well-marked cork layer.

Many, if not all, giant succulents and xerophytes are subsoil water-plants. They have the power of growing vigorously when conditions are favourable, and require for this as much water as, if not more than, other plants. *Aloe arborescens* puts out new growing roots when the earth becomes dry, and these grow rapidly when the plant is watered.

As regards the growth in thickness of the stem, the author considers that it is not a continuous process, but is active during favourable conditions only, so that it can be compared to the ordinary increase in thickness of dicotylodons. *Aloe succotrina* produces every year one ring of vascular bundles and a clearly limited zone is also formed every year in *Yucca filamentosa*, which last is not injured by the German winter.

The author considers that the monocotyledons are descended from tree-like forms with secondary growth in thickness. This ancient character is retained in the arborescent Liliifloræ. The aerial stems of other monocotyledons may be different, and the result of a phytogenetically younger method of growth.—*G. F. S.-E.*

Alpine Garden at Bourg St. Pierre. Anon. (*Gard. Chron.*, No. 1134, p. 216, fig. 93, September 19, 1908).—An interesting account is given of the Jardin Botanique de la Linnea at St. Pierre, a small village on the St. Bernard Pass between the Hospice and Martigny. The garden is situated about 5,550 feet above the sea level. It is managed by an international committee, the director being the well-known botanist M. Correvon. A very large collection of Alpine plants will be found in cultivation—not only those which are natives of Switzerland, but others from all parts of Europe, Siberia, and the Arctic regions.—*G. S. S.*

Alpinia bracteata (*Bot. Mag.*, tab. 8237).—Nat. ord. *Scitamineae*; tribe *Zingiberaceae*; Eastern Himalaya. Perennial herb with a stem

3–7 feet high; leaves to 2 feet in length, ovate oblong; racemes erect, 5–8 inches long; flowers cream-white, but labellum yellow and crimson.

G. H.

Anchusa or Bugloss. By M. Geeckhout (*Le Jardin*, vol. xxii. No. 513, p. 200; July 5, 1908; coloured plate).—The genus *Anchusa* includes some thirty species, found in Europe, N. and S. Africa, and W. Asia. The most interesting are:—

A. Barrelieri (syn. *Buglossum Barrelieri, Myosotis obtusa*)—native of Southern Europe; blue flowers with yellow throat. *A. capensis*—biennial; not hardy; blue flowers with white tube. *A. italica* (*A. azurea*)—and the Dropmore variety (*grandiflora*). *A. myosotidiflora* (*A. macrophylla*)—Siberian species, with fine blue flowers and yellow throat. *A. officinalis*—indigenous; pinkish-blue flowers. A variety *A. off. incarnata* has bright pink flowers. *A. sempervirens*—indigenous; small blue flowers. *A. tinctoria*—S. France; blue or purplish flowers; root yielding a red colour used in perfumery.

All these species are easily raised from seed, which is to be preferred to cuttings or division.—*F. A. W.*

Angadenia nitida (*Bot. Mag.*, tab. 8233).—Nat. ord. *Apocynaceae*; tribe *Echitideae*; tropical S. America. Climbing shrub; leaves 4–6 inches long; flowers in racemes, corolla yellow, with a vermilion band at the base, 1½ inch long, 1½ inch diameter.—*G. H.*

Apple, Fall Beauty. By H. Garman (*U.S.A. Exp. Stn. Kentucky*, 17th Rept. 1905, pp. 82–84; figs.).—A description and illustration of this new dessert apple in use in October.—*F. J. C.*

Apple Juice, unfermented. By N. C. Gore (*U.S.A. Dept. Agr. Bur. Chem., Bull.* 118, Sept. 1908).—Apple juice being useful as a summer drink, experiments have been undertaken as to the best means of preventing fermentation and moulding.

Sterilization, otherwise pasteurization, has been found preferable to the use of chemical preservatives (benzoate of soda) in the manufacture of fruit juices.

The objections to sterilization are that it gives a "cooked" flavour to the juice, and that the effect is not lasting.

The process can be effected in either wood or tin receptacles. The former are the better, as the juice dissolves the tin to a certain extent, though less when it is coated with lacquer. In clarification tests a milk separator was used, but this is not sufficient to produce absolute clearness. Carbonating disguises the "cooked" taste.

An atmosphere of carbon dioxide on the surface of the liquid delays the formation of mould in sterilized juice when exposed to the air for a limited time. Benzoate of soda checks alcoholic fermentation, but encourages development of acetic acid ferment, which spoils the flavour.—*C. H. L.*

Apple Leaf Blister Mite. By P. J. Parrott (*U.S.A. Exp. Stn., New York, Bull.* 306, December 1908).—This is a pest of increasing occurrence in the Eastern States, especially in western New York. The application of a lime-sulphur wash as the buds are swelling and before the leaves appear, followed by the usual sprayings with Bordeaux mixture, has been found an efficient remedy.—*A. P.*

Apple, Powdery Mildew (*Podosphaera leucotricha*) (*Dep. Agr. N.Z.*, 16th Report, 1908, p. 110).—This is stated to be the fungus formerly known as *Podosphaera oxyacantha*, and has been very plentiful during the summer months and very destructive. Being a surface mildew it is easy to control with Bordeaux mixture. It often spreads from Hawthorn hedges, which are very subject to attack; hence this plant should not be used as a shelter around orchards.—*M. C. C.*

Apple-Scab (*Fusicladium dendriticum*) (*Dep. Agr. N.Z.*, 16th Report, 1908, p. 110; fig.).—This disease has been less in evidence than in former years, and where systematic spraying has been carried out, the loss caused by it has been insignificant.—*M. C. C.*

Apple-tree Measuring Worm (Ennomos subsignaria). By H. Garman (*U.S.A. Exp. Stn. Kentucky*, 17*th Ann. Rept.*, pp. 79–81; figs.).—One of the looper caterpillars injuring apple leaves in the same way and at the same time as the larvae of the winter moth. The female moth, however, in this case is winged, and hatches out in June, laying eggs which remain unhatched over winter. Spraying in spring with Paris green at the rate of 1 lb. to 150 gallons of water is the only means of dealing with the pest.—*F. J. C.*

Apples of Maine, Seedling. By W. M. Munson (*U.S.A. Exp. Stn. Maine*, *Rept.* 1907, pp. 113–139; figs.).—Descriptions of thirty-five apples raised in Maine are given with figures and comments upon the relative usefulness of the varieties.—*F. J. C.*

Araceae, Embryology of (*Bot. Gaz.* July 1908, pp. 35–42, with 3 plates).—Mr. James Ellis Gow describes the ovary, ovule, and development of the ovule in *Nephthytis*, *Dieffenbachia*, and *Aglaonema*.—*G. F. S.-E.*

Aster diplostephioides. By Eekhout (*Le Jardin*, vol. xxii. No. 517, p. 264; September 5, 1908; coloured plate and fig.). Particularly recommended for market purposes as well as pot-culture. A distinct and handsome dwarf plant (25–30 cm. high), flowering May–June in solitary heads of a brilliant purple, with well-marked orange disc, 6–8 cm. in diameter. In habit this plant compares with *Gerbera Jamesonii*, and has the further advantage of being absolutely hardy. Like all Asters, it is easy to propagate whether by seed, division of clump, or cuttings. Sow April–May, in pots or pans, prick out in the autumn; or February–March on hot-bed, and prick out in spring. In dividing, break up the plants in spring or autumn, and let the new growths get a start, well-shaded and watered in the reserve garden. Then transfer to border. Cuttings are struck under a bell-glass, and require a little heat.

F. A. W.

Aster Wilt, *Fusarium sp.* (*Dep. Agr. N.Z.*, 16th Report, 1908, p. 109).—This disease has been very prevalent and generally appears just as the plants are commencing to flower. The roots of the affected plants are discoloured and contain a large amount of the mycelium of a fungus with pinkish coloured spore masses. This disease appears to be a soil one, and difficult to control. Asters should not be grown in infected ground for at least two years, otherwise some powdered sulphate of iron should be worked into the soil some weeks before the plants are set out.

M. C. C.

Astrantia, Biometrical Researches on. (*Beih. Bot. Centralbl.*, xxiv., Erste Abth., Heft 1, pp. 1–19).—Herr Paul Vogler of St. Gall gives some detailed researches dealing with the number of bracts, of flowers, and of male flowers in *A. major.*—*G. F. S.-E.*

Beet Sugar Industry, Progress of, in 1906. By C. F. Taylor (*U.S.A. Dep. Agr. Report* 84; May 1907).—Gives a great amount of valuable information concerning the progress in securing greater sugar yield and statistics relating to the area under cultivation of this crop in the different States. It is pointed out that beet sugar growing is productive of great good to agricultural interests in many directions.

F. J. C.

Begonia manicata. By Ad. van der Heide (*Le Jardin*, vol. xxii. No. 516, p. 244; August 20, 1908; 1 fig.).—A plea for an old and almost forgotten species introduced from Mexico in 1840. Handsome window plant, with large characteristic leaves, adorned like the petioles with long red hairs, which form a sort of gauntlet, and give the plant its name. Abundant rose-coloured flowers. There is also a white variety, *B. m. alba*, and a fine variegation *B. m. aurea maniculata*. It thrives in the winter garden or conservatory, little or no heat being required, although rich soil and plenty of water are essential. Propagation, like other Begonias, by cuttings of leaf or shoot.—*F. A. W.*

Begonia Patria. (*Le Jardin*, vol. xxii. No. 517, p. 258; September 5, 1908).—A cross obtained by M. Lemoine from *B. socotrana* × *B. Pearcei*. It resembles *B. Gloire de Lorraine*, but forms a more vigorous plant with brighter inflorescence. The flowers are magnificent—scarlet, salmon, and copper, with golden under-surface—and are very persistent, lasting unimpaired for more than a month after full development. A plant only 25 c. in height will often carry several hundred blossoms.—*F. A. W.*

Botrytis cinerea, Observations on the Biology of. By F. T. Brooks (*Ann. Bot.*, xxii., July 1908, p. 479–487).—Experiments were conducted with the well-known parasitic fungus *Botrytis cinerea* and the lettuce plant. *Botrytis* conidia were unable to infect healthy green leaves, neither could they infect plants (grown in artificial cultures) weakened by the omission of one or other of the essential elements. On the other hand conidia were capable of infecting wounded leaves just beginning to turn yellow.

Though conidia have no effect on healthy leaves, if young mycelium nourished saprophytically is placed on such leaves infection occurs at once and the fungus spreads rapidly.

In dealing with the question of direct infection of the yellowing leaves and the non-infection of the normal green leaves, the author suggests the following possibilities: (1) that some chemotropic substance present in the cells of the yellowing leaf attracts the germ-tubes, whereas no such chemotropic influence is exerted by the normal leaf; (2) that in the case of non-infection of a normal leaf some substance from the epidermal cells diffuses through the cuticle in sufficient quantity to neutralize the effect of the small amount of poisonous substance secreted by the germ-tubes, whereas no such substance diffuses from the yellowing leaf; or (3) that the change in the vital activities of the leaf consequent upon yellowing induces some alteration in the composition of the external cell-walls which enables the germ-tubes to penetrate. It is left for future research to decide which of these suggestions is correct.

With regard to the experiments on the mineral starvation of the host, the results agree with those obtained by Marshal Ward with *Puccinia dispersa*, viz. that mineral starvation of the host had no appreciable effect upon the infective power of the fungus.—*A. D. C.*

Bougainvillea Cypheri. By Aug. Nonin (*Rev. Hort.*, January 1, 1909, pp. 12, 13; coloured plate).—A very fine form indeed. Flowers (bracts) nearly twice the size of *B. glabra Sanderiana* shown for comparison. Colour identical, a great improvement.—*C. T. D.*

Cabbage and Onion Maggot. By J. B. Smith and E. L. Dickerson (*U.S. Exp. Stn., New Jersey, Bull.* 200, February, 1907; 12 figures).—In New Jersey great losses have been sustained by growers on account of the attack of these maggots upon the plants. Remedies which are successful in one district unfortunately sometimes are of no avail in others. The insects are described and their life histories given. It is considered that cultural methods of control are of little avail against the onion fly, but of great importance in the case of the cabbage maggot. It is recommended that all cabbage roots should be removed as soon as done with and destroyed; all cruciferous weeds should be destroyed; where beds of turnips, &c., have been badly affected, the ground should be ploughed late in the autumn and again early in the spring; when a crop is found to be badly infested early in its growth it should be dug in deeply; rubbish heaps should be burnt and outbuildings, &c., cleansed by sulphuring or whitewashing. The time of sowing onions also has some influence on the amount of damage done. Late sowing both in autumn and spring was found to be followed by the best results in New Jersey, as the various broods of flies were then avoided. Quick-acting fertilizers are useful, since they bring the plants rapidly over the season when attack is most to be feared. Cabbages and cauliflowers should be firmly planted, since then the newly hatched larva will be unable to make its way down through the hard soil so as to find a part of the cabbage sufficiently tender for it to attack. Various substances were tried, with varying amounts of success, as preventives, including tarred paper cards placed round the stem of the plants upon the soil, carbolic acid and lime, kerosene and sand, powdered tobacco, powdered white hellebore, dry lime, bran and glue; and as destructive measures, the application of carbon bisulphide, carbolic-acid emulsion, hellebore decoction, and other things; and carbolized lime is thought to be the best thing to use. It is made as follows, and is to be applied early, frequently, and thoroughly. The lime is slaked to a thin cream; three pints of the cream are added to a gallon of water and then a tablespoonful of crude carbolic acid, and the mixture is applied by means of a sprayer along the rows so that the surface of the ground is covered.—*F. J. C.*

Cabbage, Insects Injurious to. By H. Garman (*U.S.A. Exp. Stn. Kentucky, 17th Ann. Rep.*, 1905, pp. 20-47; 17 figs.)

Cases have been reported where poisoning following the eating of cabbages which have been sprayed has occurred. It is pointed out that if reasonable precautions as to stopping spraying sufficiently long before the plants reach a marketable size, are taken, there is so little of the spray left that there is no possibility of poisoning occurring. Analyses are given demonstrating this. The insects attacking the cabbage are then described and figured, and appropriate remedies, usually spraying with arsenical sprays, such as Paris green or arsenate of lead, are recommended. The insects dealt with are the white butterflies or cabbage worms (*Pontia rapae*, the well-known British small white butterfly, and *P. protodice*, the former being the most troublesome of all the insects attacking cabbage), the larvæ of the moths, the cabbage looper (*Autographa brassicae*), the southern cabbage moth (*Evergestes rimosalis*), the cabbage Plutella (*Plutella maculipennis*), an insect of world-wide distribution, the zebra (*Mamestra picta*), the army worm (*Heliothis unipuncta*), the corn worm (*H. armiger*), the woolly bear or tiger moth (*Diacrisia virginica*), the cutworms (*Peridroma margaritosa, Agrotis ypsilon, Prodenia ornithogalli*, and *Mamestra trifolii*), the flea beetles (*Phyllotreta vittata, P. sinuata*, and *Systena blanda*), the spotted cucumber beetle (*Diabrotica 12-punctata*), the margined blister-beetle (*Epicauta marginata*), the harlequin cabbage bug (*Murgantia histrionica*), the false chinch bug (*Nysius angustatus*), the cabbage plant louse (*Aphis brassicae*) the cabbage leaf-miner (*Drosophila graminum*), the turnip leaf-miner (*D. flaveola*) the cabbage Anthomyia (*Pegomya fusciceps*) and the onion thrips (*Thrips tabaci*).—*F. J. C.*

Camassia esculenta. By C. Potrat (*Le Jardin*, vol. xxii. No. 517, p. 262; September 5, 1908; 1 fig.). -A vegetable, one of the *Liliaceae*, indigenous in California. It has the advantage of being a pretty garden-plant, 18 inches high, with bright green leaves and blue flowers, of the Ornithogalum type. Two horticultural varieties are *C. e. alba* and *C. e. atro-coerulea*. The plant is hardy, but resents damp. When roasted, the bulb (which is the edible part) has a flavour between a yam and a potato. Flour prepared from it is used in confectionery, and as a remedy for coughs. Cultivate from seeds or offsets. Sow the seeds in July–August, when ripe. Prick out September-October, when the bulbils may also be planted. These will produce flowers the next year, but plants from seed require two years to come to maturity. Flowers May–June. Take bulbs up in August, as soon as the plant turns yellow. They dry very quickly on exposure to air, and should be stacked as soon as possible.—*F. A. W.*

Campanula Rapunculus (Raiponce). By C. Potrat (*Le Jardin*, vol. xxii. No. 513, p. 202; July 5, 1908).—This plant is worthy of cultivation as a winter vegetable. Both leaves and root have an agreeable flavour; it may be eaten raw, as salad, or cooked like spinach. The root resembles a crisp white radish. The plant is easily raised from seed, but late sowings (end of June or July) are advisable—otherwise it is apt to run to flower. As the young plants are at first very tender and liable to dry off, it is well to shade them by simultaneously growing some other vegetable, such as summer radishes, which are lifted before the raiponce reaches perfection. It is ready in October and can easily be protected from frost by a light frame and mats.—*F. A. W.*

Carica Papaya. By C. Bernard (*Ann. Jard. Bot. Buit.*, vol. vii., pp. 56–68; 2 plates).—The abnormal fruit occasionally produced by *Carica Papaya* is described.—*S. E. W.*

Carnations, Perpetual Flowering. By E. C. (*Garden*, January 1909, pp. 14, 30, 39).—The use of these as garden plants is recommended, particularly among roses, and they are stated to be hardy, and Rev. Joseph Jacob, continuing a previous article, gives directions as to the indoor treatment of these plants.

Mr. M. C. Attwood objects to the use of the term "American" in reference to the Perpetual-flowering Carnation, and thinks we are on the eve of further improvement in habit of growth and formation of flower in these plants.—*H. R. D.*

Carnations, Sporotrichum Bud Rot. By F. C. Stewart and H. E. Hodgkiss (*U.S.A. Exp. Stn. Geneva, N.Y. Tech. Bull.*, October 7, 1908; 4 plates).—Carnations affected with bud rot are invariably infested with a certain fungus (*Sporotrichum anthophilum*, Pk.) almost constantly associated with a particular species of mite (*Pediculoides dianthophilus*, Wol.). Outwardly the affected buds usually appear like normal buds partially opened, but internally they are brown, decayed, and generally mouldy. The stamens, styles, and lower portion of the petals are attacked first; frequently the pistil also is affected. The brown decayed tissue is permeated by the mycelium of the fungus. Experiments prove that the *Sporotrichum* alone is capable of producing the disease. All affected buds should be picked and burned as soon as they appear.—*M. C. C.*

Ceratozamia, Seedling of. By Helen A. Dorez (*Bot. Gaz.*, September 1908, pp. 203–217; 4 plates).—The seedling has two cotyledons; the paper deals with its anatomy, certain stages in development, and various morphological details.—*G. F. S.-E.*

Ceropegia, Vegetative Development of. By Joseph Glabisz (*Beih. Bot. Centralbl.* xxiii. 1te Abth. Heft 2, pp. 65–136, 30 figs. and 3 plates).—The stem-tubers of this plant are normally formed at the stem-nodes. When separated from the plant both internodes and leaves are capable of producing both tubers and adventitious roots. The free-hanging branches grow at the tip and their adventitious roots remain quite short, but if laid on the ground the latter form strong branching roots which enable the main shoot to grow more vigorously. When grown in water, the want of nourishment seems to produce an increased formation of tubers and of adventitious roots. The plant can exist and form new growths when supplied with cane sugar only, but not when glycerine is used. If the growing point is prevented from development, the axillary shoots increase greatly, and the formation of tubers is also favoured, especially when the plant is prevented from forming axillary shoots. Tuber formation is favoured by darkness.—*G. F. S.-E.*

Cherry 'Bigarreau tigré.' By Max Garnier (*Rev. Hort.*, December 16, 1908, p. 570; coloured plate).—A very handsome dark crimson fruit prettily mottled with lighter tints, or *vice versâ.*—*C. T. D.*

Chestnut Oak in the Southern Appalachians. By H. D. Hoster and W. W. Ashe (*U.S. Dep. Agr. Forest Service, Circ.* 135; 23 pp.).—This would appear to be a most useful timber, the uses to which it is at present applied being exceedingly varied and numerous. In Western Virginia about one-half of the cross-ties on local railroads are chestnut oak, while for furniture, farm implements, tool handles and in wagon-making the wood is largely employed. Not only is the chestnut oak valuable for its timber, but the bark is extensively used in the tanneries, and employed on account of the tannic acid it contains. The management of the tree, list of insect pests, susceptibilities to fire and injury by grazing, and reproduction by seed and sprout are all carefully explained.—*A. D. W.*

Chile Culture. By Fabian Garcia (*U.S.A. Exp. Stn., New Mexico, Bull.* 67, 1908; illustrated).—The chile is largely grown in New Mexico for home consumption. The taste for it among Americans is on the increase. It is rather less tender than the tomato, and can be sown in the open early in April, or raised in frames end of January and planted out. This is the best, though less common way.

The chile resists drought fairly well, but, as it continues bearing as long as it is kept growing, irrigation is valuable.

The pods, when ready for picking green, should be smooth, shiny, and from 4 to 6 inches long.

Chile is canned when green, or eaten fresh (both green and ripe).

C. H. L.

Chrysanthemums (*Le Jardin*, vol. xxii. No. 521–2; November 5–20, 1908; illustrated).—The whole of No. 521 and several articles in 522 are devoted to the Chrysanthemum. There are pictorial articles on the early varieties and first cultivators of the flower, an article on judging by points, by M. Rivoire—another by M. T. Carnon on grafting—another on fertilization by M. Mommeye, who also contributes an account of the Chrysanthemum and its culture in Japan, with copious illustrations.

F. A. W.

Chrysanthemums, A Classified List of (*Jour. Soc. Nat. Hort. Fr.*, p. 115, February 1901).—A classified list of all the best varieties of chrysanthemum now in cultivation, prepared with the help of a great many chrysanthemum growers. The groups include the best early kinds, the best late kinds, the hardiest kinds, the easiest kinds to grow; the dwarf kinds, incurved kinds, the largest-flowered kinds; the best colours &c.—*M. L. H.*

Clematis Rust (*Aecidium Otagense*). (*Dep. Agr. N.Z.*, 16th Report, 1908, p. 109).—Reported on five species of Clematis. Only at present known in the cluster-cup stage, and this considerably on the increase. If the infection takes place towards the ends of the climbing branches it would be best to cut away the diseased branches below the points of infection and burn them. Spraying with Bordeaux mixture will to a great extent hinder spore formation and lessen the danger of further infection.—*M. C. C.*

Clerodendron ugandense (*Bot. Mag.* tab. 8235).—Nat. ord. *Verbenaceae*; tribe *Viticeae*; tropical Africa. Shrub 3–10 feet high; leaves opposite, 1½–4½ inches long; flowers forming a panicle of few-flowered cymes; corolla irregular, anterior lobe ¾ inch long, violet-blue, others ⅓ inch long, pale blue; filaments purple, arched upwards.—*G. H.*

Clitoria arborescens, Pollination of. By A. F. (*Bull. Bot. Dept., Trin.*, No. 58, April, 1908, p. 79).—From the writer's minute observations and careful experiments it appears that the pollination is effected through three distinct processes.

1. It is mechanical, and consists of (first) a sinistrorse and (secondly) a dextrorse gyration of the carina, in which the pollen is brushed from the anthers by stylar brushes into the funnel of the carina.

2. Heavy insects, viz. bees and wasps, visiting and shaking the flowers, cause the pollen to fall into the concavity of the vexillum, whence some grains on the insect's legs are transported to other flowers, and fall into a small protected space formed by the bases of the vexillum and the free anther, the latter helping to rub pollen from the insect.

3. Ants, which visit the flowers freely, carry pollen grains attached to their bodies, and leave them on the stigma.

Protected blossoms artificially dusted with their own pollen were in no instance fertilized.

Under similar conditions cross pollination resulted in a 93 per cent. fertilization.

One plant only has been experimented with, and the writer suspects small flying insects may effect fertilization in its natural habitat, and hopes to make further investigations.—*E. A. B.*

Codling Worm, Spraying for. By H. A. Gossard (*U.S.A. Exp. Stn., Ohio, Bull.* 191, February 1908; 2 figures and 21 plates).—The experiments in spraying were conducted, in an orchard of about twelve acres, in a district particularly subject to this pest, the principal materials used being Bordeaux mixture, arsenate of lead, and Paris green. There is nothing very definite in the conclusions as to the relative merits of these different washes (p. 117), but the results of the sprayings were very marked, the net profit from spraying (p. 125) an average-sized tree from twelve to twenty years old in one season, at a cost of 30 to 50 cents, being estimated at $3 to $7 when the apples were worth $1 per bushel, a conservative estimate of the profit from spraying the whole orchard being $1,400 (p. 121); trees of the same size (standards 20 feet in height and diameter) in neighbouring unsprayed orchards produced less than one-fourth as much marketable fruit. At least three sprayings annually are recommended to secure good results (p. 125), some growers in the district making five or more; and the essentials for success are stated to be thorough work, applications at the right times, and a good spraying outfit —in this case a gasoline power pump, a 250-gallon tank on trucks with an elevated platform, and bamboo extension rods ten feet long, each terminated by a cluster of four Vermorel nozzles.

Paris green is not recommended for the July spraying, as it is considered to cause excessive falling of the fruit due to the burning of the stems, while Bordeaux mixture or arsenical compounds in cold wet springs conduces to excessive russeting in the fruit (p. 111).—*A. P.*

Cold Chambers, How to construct. By S. F. Walker (*Gard. Chron.*, No. 1141, p. 321, figs. 135, 136, and 137, November 7, 21, and 27, 1908).—Very concise directions are given in this paper for the construction of cold chambers, in which cut flowers may be kept fresh for long periods and plants in bud may be retarded. The writer, in mentioning various substances which are more impervious to heat, hardly seems to realize that it is not the matter of which the substance is composed, so much as the amount of air that they contain, which make them good or bad conductors of heat, though he admits that "of all thermal insulators still dry air is by far the best." Yet he writes of filling the space between two walls with some insulating material, and ramming it well down. One would have thought that if the material was put in lightly it would have been more efficacious; some is wanted to prevent currents of air being set up.—*G. S. S.*

Coniferous Conescales. By Dr. Aug. Bayer (*Beih. Bot. Centralbl.* xxiii. 1$^{\text{te}}$ Abth. Heft 1, pp. 27-44; one plate).—Dr. Bayer by anatomical sections, by the examination of abnormal cones of *Cryptomeria*, and by studying the embryonal development, confirms Velenovsky's interpretation of the conescales of this genus.

Whereas the ovule is borne on a simple carpel in *Juniperus*, *Thuja* and *Chamaecyparis*, the conescale in *Cryptomeria* is a bract to which is fused a reduced axillary shoot; the teeth of the bract represent so many fertile ovule-bearing carpels which belong to this rudimentary shoot, but are united with the bract.—*G F. S.-E.*

Cotoneaster rotundifolia. (*Garden*, January 1909, p. 19).—"D." recommends this variety on the ground that the birds do not interfere with the berries as they do in the case of other species of Cotoneaster.

H. R. D.

Cotton Wilt. By W. A. Orton (*U.S.A. Dep. Agr. Farm. Bull.* 333, 1908; with 11 woodcuts).—The most characteristic symptom of wilt is a browning of the woody portion of the stem and root. These discoloured parts are the water-carrying vessels which have become obstructed by the development in them of the fungus causing the disease.

The "wilt fungus" is reported as *Neocosmospora vasinfecta* (Atk.). It lives in the earth on decaying organic matter until it encounters the small feeding roots of the Cotton, which it enters. The fungus penetrates the vascular system of the root and grows upwards into the stem. A rotation of crops must be worked out in detail for each farm to fit its particular needs.—*M. C. C.*

Cultivation—Soil.—By Andrew Elliott (*U.S.A. Dept. Agr., Maine*, vol. vii. ; Dec. 1908.—Emphasizes the importance of deep and thorough cultivation.—*C. H. L.*

Cuscuta Seeds, Distinctions. By H. von Guttenberg (*Nat. Zeit. Land-Forst.* Vol. 7. pp. 32–43, figures 1–7. January 1909).—The difficulty in distinguishing various species of dodder in clover seeds is pointed out, and a method is described for identification by means of miscroscope-sections through the seed-coat. The figures give anatomical details ; but, as pointed out later (p. 176), the titles of certain figures have been interchanged.—*W. G. S.*

Cycas Micholitzii (*Bot. Mag.*, tab. 8242).—Nat. ord. *Cycadaceae* ; tribe *Cycadeae* ; Indo-China. Stem 2 feet high, 1½–4 inches thick ; leaves 2–3, erect, 8–10 feet long, ¾–1 inch wide ; male cone, narrow-cylindric, 6–7 inches long, with yellow scales.—*G. H.*

Cyclamen Disease (*Le Jardin*, vol. xxii. No. 513. p. 204 ; July 5, 1908). — *Heterodora radicicola*, cyclamen pest, is considered by M. Pylion, Professor of Agriculture at Ferrara, to come like many fungoid diseases from the indiscriminate use of compost of heather and chestnut leaves. Sterilization of earth and pots is recommended, or carbon bisulphide in the proportion of 60–100 grammes per metre cube of compost.—*F. A. W.*

Daphne, The Genus. By Emile Cadeceau (*Le Jardin*, vol. xxii. No. 513, p. 199 ; July 5, 1908 ; 1 fig.).—A plea for the introduction of Daphnes, other than the *D. Mezereum* and its white var. *albida*. Among those cultivated by M. Lalande, at Malville, near Nantes, are *Daphne japonica*, which is, however, evergreen and perfectly hardy, forming (at Nantes) bushes nearly 5 yards in circumference and covered with sweet-scented blossoms. The leaves have a yellow margin.

D. odora differs from *D. japonica* in being only half-hardy. Flowers less abundant, but deliciously sweet.

D. Dauphini, with purple flowers, is quite hardy in France.

Other species dealt with are *D. cneorum*, *D. Verloti*, *D. alpina*, and *D. Fortunei*.—*F. A. W.*

Datura meteloides. By F. L. Pyman and W. G. Reynolds (*Jour. Chem. Soc.* vol. xciii., Dec. 1908, pp. 2077–2081). – An investigation showed ·4 per cent. alkaloids present, including ·13 per cent. hyoscine, ·03 per cent. atropine, and ·07 per cent. of a new alkaloid, which the authors have named "meteloidine" ; some of the properties of this substance they have investigated, but purpose further research.—*W. A. V.*

Disease-receptivity and Immunity. By E. Münch (*Nat. Zeit. Land-Forst*), Vol. 7, pp. 54–75, 87-114, and 129–160, 8 figures, January, February, March 1909). –This investigation deals in an exhaustive manner with questions of importance in diseases of plants. It is not sufficient to name a fungus or other cause in investigating disease, and recent work has been much more directed towards investigation of disposition to disease. A plant is said to be immune when it is in such a condition that it is not attacked by a disease-producing agent. Disposition arises from various conditions, such as locality. The author distinguished "disease-receptivity" as a condition of the plant which favours disease. Thus a plant must be frost sensitive before it can be damaged by frost. The results obtained in this paper may be best illustrated by an example. Pine wood is immune against a particular fungus (*Ceratostomella*) if the volume of air in the fresh wood is below 15 per cent.; with increasing air-volume this fungus grows better and has its optimum growth when the air-content is 42 per cent. of the volume of the wood. This was found to be the case with other fungi, including *Nectria*, the tree-canker fungus. The results lead to the following general principles: the relationship between immunity and receptivity on the one hand, and air-content on the other, holds good for living plants as well as dead stems; different parasitic fungi have different air-requirements.—*W. G. S.*

Dry-Land Agriculture. (*U.S.A. Dept. Agr., Bur. Pl. Ind., Bull.* 130, October 1908).—This bulletin consists of a series of papers read at an annual meeting of the Co-operative Experiment Association of the Great Plains area, and is a record of the efforts which are being made to remove the difficulties under which cultivators in the semi-arid regions of the Great Plains are labouring. The questions of conservation of moisture, the prevention of soil-blowing, the use of fallows, the proper rotation of crops, and the breeding of grain and fruit which shall be able to resist the unfavourable conditions of the district are all touched upon. Tabulated statistics are also given of rainfall, temperature, comparative moisture of soil, and cost of producing crops at various experimental stations in the regions.—*M. L. H.*

Dumortiera, Inflorescence of. By A. Ernst (*Ann. Jard. Bot. Buit.*, xvii., pp. 153 224; 7 plates).—*Dumortiera trichocephala* and *D. velutina* occur in Java and other islands of the Malay Archipelago. The inflorescence of *D. trichocephala* is monœcious, or frequently androgynous, *D. velutina* is dioecious, and rarely androgynous.—*S. E. W.*

Electrified Plants. By A. Koltonski (*Beih. Bot. Centralbl.* xxiii. 1te Abth. Heft 3, pp. 204–272, figs. 8 in text).

The paper contains an interesting historical sketch dealing with what has already been discovered in this important subject, followed by a record of the author's careful experiments, which are detailed in fourteen tables.

The researches of Thouvenin and Pollacci have already proved that under electrical currents the process of assimilation is more active and energetic provided the currents are not so strong as to injure the tissues. The author cannot confirm Pollacci's observation that even in the dark, electrical stimulation will produce assimilation.

His own experiments were carried out with plants of *Elodea* placed in water. When the current passes from the base to the tip, assimilation is favoured, but when it passes in the reverse manner, the current has an injurious effect.

When the current passes through the water only, it has also a favourable effect, however the plant is placed (parallel to or at right angles to the stream lines), except when passing from the tip to the base, when it is decidedly injurious. It is apparently comparatively easy to electrocute *Elodea*. With a sufficiently weak current the stimulation of assimilation can be carried on indefinitely.—*G. F. S.-E.*

Encephalartos Barteri (*Bot. Mag.* tab. 8232).—Nat. ord. *Cycadaceae*; tribe *Encephalarteae*; West Tropical Africa. Stem short, 1 foot high, 9 inches diameter. Leaves 3½–5½ feet long; male cone pale, narrow-cylindric, 5–9 inches long; female cone dark olive, 8 inches long; seeds with crimson testa.—*G. H.*

Endosperm of some Graminaceae, The Vitality and Self-digestion of. By D. Bruschi (*Ann. Bot.*, xxii., July 1908, pp. 449–463).—The paper is an abstract of the author's previous work on the subject which has been published in Italian journals. It is shown that the starchy endosperm of maize, barley, wheat, and rye can digest itself in the absence of the scutellum and other parts of the embryo, though to a very different degree. The self-emptying can go on in the absence of any vitality in the amyliferous cells, because the starch hydrolysis is accelerated by a strong amylose which arises from a pro-enzyme existing in the endosperm of the resting seed, and becomes active even though every trace of vitality has been removed from the entire endosperm. Vitality is not, however, wholly denied to the endosperm cells. It is possessed by the aleurone cells at the periphery of the endosperm and also in one or two sub-aleuronic layers, whence it lessens by degrees till it completely disappears towards the middle of the endosperm.—*A. D. C.*

Enzymes. By Professor Kohl of Marburg (*Beih. Bot. Centralbl.* xxiii. 1te Abth. Heft 1, pp. 64b–64o).—Professor Kohl of Marburg has an important paper on the reverse working of various enzymes and on the effect of external factors on enzymes such as invertase and maltase to which reference should be made in the original.—*G. F. S.-E.*

Eranthemum Wattii (*Bot. Mag.* tab. 8239).—Nat. ord. *Acanthaceae*; tribe *Ruellieae*; North India. Perennial herb; leaves ovate, 2½–4 inches long; spikes paniculate; flowers 1 inch diameter, purple.—*G. H.*

Eria rhynchostyloides (*Bot. Mag.* tab. 8234).—Nat. ord. *Orchidaceae*; tribe *Epidendreae*; Java. Epiphyte; leaves 6 inches to 1 foot long; flowers whitish with a purple column, in a dense raceme, 7 inches long.—*G. H.*

Escallonias. By J. Clark (*Gard. Chron.*, No. 1146, p. 408, December 12, 1908).—This paper consists of an annotated list of the best species of this genus, and the author says "some of them are unfortunately too tender to be generally recommended, but full exposure to the sun and a poor, fairly dry soil will enable some of them to withstand much more severe weather than they otherwise would."—*G. S. S.*

Evolution—Descent of Angiosperms. By Hans Hallier (*Beih. Bot. Centralbl.*xxiii. 2^{te} Abth. Heft 2, pp. 81–265).—Herr Hallier, in the course of a very exhaustive inquiry into the affinities of *Juliania*, gives evidences for his belief that the Angiosperms are descended from now extinct Magnoliaceae which had hermaphrodite, acyclic and apocarpous flowers with a perianth and branched stamens. These sprang from Gymnosperms which resembled *Cycas*, *Anomozamites* and *Cycadeoidea* in appearance.

He supposes the lines of descent to be somewhat as follows: Julianales (also Juglandales, Anacardiaceae &c.) from Terebinthaceae, Rutaceae, Saxifragaceae, Hamamelidaceae, Illicieae, Magnoliaceae.

The paper is of great importance in connection with the vexed question of the descent of Angiosperms.—*G. F. S.-E.*

Evolution, Methods and Causes of. By O. F. Cook (*U.S. Dep. Agr., Bur. Plant Industry, Bull.* 136, pp. 31, October 31, 1908.—This paper expresses, in a somewhat dogmatic form, the author's views upon the theory of evolution. He lays stress upon the fact that selection does not make new characters. On this point Dr. Alexander Graham Bell (cited in the introduction) also points out that "though natural selection may cause the death of the unfit, it cannot produce the fit—far less evolve the fittest. . . . A closed gate may block a road, but it does not push the traveler (*sic*) into a new path."

In one place the author says "transfers of cotton and other plants to new conditions are often followed by striking changes of characters far beyond the range of ordinary environmental accommodations." On the next page: "It has not been shown that the environment has any active constructive influence in descent either in individual organisms or in species at large."

He seems to ascribe the greatest significance in evolution to the "normal diversity of natural broad-bred species." He does not explain how the original species became diverse. But the precise position adopted by the author is elaborated in the paper itself.—*G. F. S.-E.*

Fairy Rings on Lawns. (*Garden*, January 1909, p. 13.)—For the destruction of these rings, Bordeaux Mixture or sulphate of iron, using 8 lb. to the gallon, is recommended.—*H. R. D.*

Flora of Turkestan. (*Beih. Bot. Centralbl.* xxiii. 2^{te} Abth. Heft 3, pp. 341–386).—Fedtschenko's Conspectus is continued in this paper, which is concerned only with *Astragalus* (27 species).—*G. F. S.-E.*

Fodder-hairs, Wax and Honey. By Dr. Josef Fahringer (*Beih. Bot. Centralbl.* xxiii. 1^{te} Abth. Heft 3, pp. 191–203; one plate).

Dr. Fahringer in a criticism of Porsch's account of the Flowerwax and "Fodder-hairs" of certain orchids gives an interesting review of the chemistry of these and similar bodies. Flower-honey contains a much larger amount of water and more saccharose than bee-honey, which last contains dextrin, nitrogen, and formic acid. None of these substances occur in the flower-honey.

The fodder-hairs resemble pollen in containing fatty acids and nitrogenous substances, but are much richer in nitrogenous material.

The wax of *Ornithidium* is used, in his opinion, for propolis; it both guides larger insects to the flower and also keeps off unbidden guests which often get stuck on the sticky surface. It is especially flowers that have no pollen to spare that produce it.—*G. F. S.-E.*

Forest Scenery of Cameroons. By Dr. F. C. von Faber (*Beih. Bot. Centralbl.* xxiii. 2^{te} Abth. Heft 1, pp. 26–42).—Dr. von Faber gives a very readable account of the vegetation of this part of tropical Africa illustrated by five good photographic plates.

The rainfall at Bibundi reaches the enormous amount of 11,900·65 millimetres, which is one of the heaviest known in the world. The chief peculiarity of the vegetation is the rich rain-forest or tropical wet jungle which ascends the mountains sometimes to 2,000 m. altitude or in ravines to 2,700 m.

There are clear and interesting descriptions of the mangrove creeks and of the way in which the mangroves give place to other plants when the soil level becomes higher than that of ordinary high tides. This first vegetation consists chiefly of *Raphia* palms, with *Pandanus*, *Phoenix spinosa*, and *Retanga*. There are also many interesting details about the oil palm and its cultivation, Cola, the silk-cotton tree and other useful plants.—*G. F. S-E.*

Freezing, Fall and Early Winter Injuries to Orchard Trees and Shrubbery by. By A. D. Selby (*Agr. Exp. St. Ohio, Bull.* 192; figs.).—This bulletin goes fully into the unprecedented damage done to orchard trees and shrubs during the unusually severe winter of 1906–7. The losses were most pronounced upon young apple orchards; the percentage of seriously injured trees ran extremely high and with certain varieties was astonishingly large. The investigations will no doubt prove extremely valuable in determining which varieties of apple are most suitable for withstanding severe frosts, and under what conditions of growth and soil, and other surroundings, they are safest from injury.

A. D. W.

Frost, Notes on. By E. B. Garriott (*U.S.A. Dept. Agr., Farmers' Bull.* 104, 1908).—In the States protection against severe frost is very essential, as it often means saving the life of acres of plants and trees, and also makes it possible to put an early and paying crop on the market.

This protection is applied to orchards, berry plantations, and vegetables, and is effected in different ways according to situation, extent of land, and duration of frost. Irrigation, flooding, and spraying with water, by supplying moisture to the air, lessens danger from frost. Smudge fires, produced by burning damp material such as straw, manure, or prunings are a recognized means of protection, and should, to be efficacious, be numerous and well distributed.

Where coal is used to raise the temperature, twenty to fifty baskets of fire are required to the acre.

Other means of protection are earthing up, mulching with hay, and screening of light material.

The forecasts of the Weather Bureau are an invaluable aid to growers.
C. H. L.

Frost of April 19-20, 1908. By L. Chasset (*La Pomologie Française*, June 1908, p. 163).—The effect of the frost is not entirely shown by the number of flowers that open on the day of the frost and the following days; their opening is not hindered, but upon attentively examining the pistils and stamens, one sees that they are blackish from the time of the opening of the petals. The varieties of Pear that resisted the frost best were 'Beurré Clairgeau,' 'Triomphe de Vienne,' and 'Marguerite Marillat'; although the following varieties were planted by the side of these three, in spite of the abundance of blossom none of them bore fruit: viz. 'Beurré Hardy,' 'Le Lectier,' 'Duchesse d'Angoulême,' 'Figue d'Alençon,' 'Beurré Diel,' 'Directeur Hardy,' 'Belle Angevine,' 'Beurré gris.' The 'Reinette du Canada' Apples planted as cordons suffered equally, because of their early blossoming; the variety 'The Queen,' on the contrary, fruited abundantly.—*C. H. H.*

Fruit Crops, Reports on the Condition of our. (*Gard. Chron.*, No. 1,127, p. 81, August 1, 1908.)—This report gives in a tabulated form the observations made by a large number of correspondents in the various counties in the British islands on the condition of the fruit crops; in the grand summary the figures for 1907 are given for comparison.—*G. S. S.*

Fruit Gardens for the Intensive Cultivation of Choice Fruits, Establishment of Model. By O. Opoix (*Pomologie Française*, February 1908, pp. 100-112).—The chief gardener of the Luxembourg suggests that taking into consideration the rapid increase in fruit growing in the last ten years, and competition especially with regard to apples from America, model fruit plantations should be established in the fruit districts of France. He explains the choice of soil, situation, treatment, walls for espaliers, with the best varieties of pears and apples for the climate of Paris, also for the centre, east and north of France, and gives details of cost of establishment and returns from a garden such as he suggests, of which a plan is given, established by M. Grouas at Precy-sur-Oise (Oise), the area being about 1½ acre.—*C. H. H.*

Fruit injured by Insects. By H. Garman (*U.S.A. Exp. Stn. Kentucky*, 17*th Ann. Rept.* pp. 63-78).—Injuries to fruit through the skin being cut (and pulp being afterwards extracted through the slit by bees) have been traced to tree crickets (*Oecanthus angustipennis* and *Oe. niveus*), which slit the skins of peaches, plums, grapes, &c., at night, and the common green "June bug" or beetle (*Allorhina nitida*). The remedy suggested against the last is to shake the beetles into a pail of water covered with a film of coal tar. It was found that the insects very frequently inoculated the fruits which they bit with the spores of the brown-rot fungus, fruits which were protected from being bitten by a muslin cover or by spraying remaining perfectly healthy.—*F. J. C.*

Fruit Trees, Arrangement of, on a Plantation. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, pp. 80–86).—The hexagonal arrangement produced an improvement in results as compared with planting on the square, but the experiment was on too small a scale to justify a modification of the conclusion previously drawn—that the slight improvement is not worth consideration in comparison with the cultural advantages presented by the square arrangement.—*A. P.*

Fruit Trees, Chemical Manures for. (*Jour. Soc. Nat. Hort. Fr.*, p. 763, December 1908).—According to the writer, owing to the character of their root system, chemical manures are not so suitable for fruit trees as organic manures.—*M. L. H.*

Fruit Trees, Influence of the Date of Planting. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, p. 73).—Twenty-nine out of forty-two trees planted on November 14 showed the formation of rootlets by January 16 following, the plum stocks having made the greatest number of rootlets, and experiments lead the authors to the conclusion that where planting cannot be done till late in the season it is best to defer lifting the trees from the nursery till the ground is ready to receive them. The advisability of cutting trees at the time of planting, even when the trees are planted late in the season, is still maintained (pp. 74–75).—*A. P.*

Fruit Trees, Planting above the Ground Level in Heavy Soils. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, p. 71).—After ten years' growth there was no appreciable difference between trees so planted and those planted in the ordinary way.
A. P.

Fruit Trees, Nourishment of, by Injection. By G. Fron (*Jour. Soc. Nat. Hort. Fr.*, p. 54; January 1908; Figures).—An account of the treatment of sickly and badly nourished trees by injection of sulphate of iron and calcium acetate into the trunk. The operation is admitted to be a delicate and dangerous one, and the results are so far so little assured that it is on the whole advised rather to renew the soil round starved trees or to transplant those in unsuitable positions.—*M. L. H.*

Fruit Trees: Ramming the Soil when Planting. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, pp. 7–30).—The soil was rammed with a heavy rammer till the whole was thoroughly puddled and shook like a jelly at each stroke. The number of cases where this treatment produced increased growth in the first and second seasons after planting, compared with that of trees carefully planted in the usual way, was from four to six and a half times greater than where the opposite was the case. As regards fruiting, no positive conclusions could be drawn. The authors explain the results as being due to the closer contact of the soil aiding in the formation of adventitious root-fibres from the main roots, where there is the greatest store of food material; the fibrous roots, which we have always been told to spread out so carefully, containing but little accumulation of reserve material out of which new rootlets may be made, and on trees which have undergone a journey, at least, seldom making any but the feeblest growth. The scientific basis of the results of this improved contact of the soil with the roots, and of the varying behaviour of the latter when rammed in different soils, is dealt with in an article by Mr. Pickering in his "Studies on Germination and Plant Growth" in the Appendix to this Report (reprinted from the "Journal of Agricultural Science." vol. 2, part iv.).

A. P.

Fruit Trees: Root Injury on Planting. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, pp. 38–56).—The conclusions arrived at confirm those expressed in the Fifth Report: namely, that the various items which are supposed to constitute "bad practice" in planting are not only not deleterious to the trees, but result in a certain amount of good, and the authors justify this by referring to experiments which go to show that trees benefit by the removal of fibres up to 1 mm. in diameter, as well as by the shortening of the larger roots, the latter practice helping the formation of more vigorous adventitious roots nearer the stem, and they maintain that it is the formation of new roots, and not the preservation of old ones, which should be the aim in planting trees.—*A. P.*

Fruit Trees: Trenching the Soil before Planting. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908).—The bastard trenching of the soil before planting has not, as a rule, produced any good results, and the authors advise growers not to go to the expense of trenching without strong evidence that such a process has actually been found to be beneficial to the particular soil in question. Where the soil is deep and fertile it may have good results, as well as in cases where it improves the drainage.—*A. P.*

Fruits in Virginia and South Atlantic States, Orchard. By H. P. Gould (*U.S.A. Dept. Agr., Bur. Pl. Ind., Bull.* 135, December 1908).—This is the first published report of the fruit district investigations of the Bureau of Plant Industry, and the object in making them has been to ascertain the limitations within which fruit varieties may be profitably planted in these regions, as indicated by the manner in which they respond to the influences of their environment, the success of a given variety being not alone "its ability to develop to a high degree of perfection, but its commercial value in terms of profit and loss when placed upon the market" (p. 9). Based upon the observations of 63 growers, descriptions are given of all the varieties of fruits commonly grown in the districts in question (pp. 30–62) with their varying behaviour at different elevations and in different soils, and these are supplemented by elaborate phenological records by the same observers (pp. 68–95). For instance, there are returns by 53 growers on Ben Davies apple, giving the latitude, elevation, slope, and soil where it was grown in each case, with the dates of blossoming in given years and of the last spring and first autumn frosts, the times of gathering, the periods of its season, &c. The report must prove a boon to intending planters in the States mentioned, and is an object lesson which should not be missed by all Government and county officials who are concerned in rendering assistance to fruit growing in this country.—*A. P.*

Fumigation of Nursery Stock, Tests of Gases for. By W. E. Britton (*Journ. Ec. Entom.*, I. (1908), Pt. 2, pp. 110–112).—These tests were undertaken with a view to find some gas more convenient than hydrocyanic acid gas for fumigating small parcels of nursery stock. The fumigation was carried out in an oblong box, and two generators were used—one at each end. Apples infested with San José scale were used. The gases tested were carbon bisulphide, carbon tetrachloride, sulphuretted hydrogen, and chlorine, while for purposes of comparison hydrocyanic acid gas in three different quantities was used. No recommendations are yet made.

Carbon bisulphide. This was volatilized in iron pans which had been heated. When used at the rate of 10 oz. to 100 cubic feet for one hour, 4·3 per cent. of the scales survived and one tree died. When 60 oz. of carbon bisulphide to 100 cubic feet was the charge allowed to act for three hours at 58° F., all the scales were killed and the trees uninjured. After being exposed to gas of a strength above this, half the trees failed to grow.

Carbon tetrachloride. All the scales were killed and the trees were uninjured where 90 oz. or less to 100 cubic feet was used and allowed to act for two hours.

Hydrocyanic acid gas. Generated with 1 oz. of potassium cyanide to 2 oz. sulphuric acid and 4 oz. of water to each 100 cubic feet, all scales were killed. In one case, after fumigating for half an hour, one tree died. In most other cases the trees were uninjured, even by larger quantities of gas acting for a longer period.

Sulphuretted hydrogen. Generated from iron sulphide 20 oz., sulphuric acid 40 oz. (fluid), water 32 oz. (fluid). The quantity of iron sulphide for 100 cubic feet was 9 lb.; and other strengths used were 12½ lb. and 25 lb. In the last case 20 per cent. of the trees were injured after fumigation for two hours; but in other cases no injury followed, and all the scales were killed.

Difficult of application, on account of the long time taken to generate the gas.

Chlorine. Generated from bleaching powder 14 oz., sulphuric acid 17 oz. (fluid), water 70 oz. (fluid). The quantities used varied from 8·6 lb. to 34·7 lb. to each 100 cubic feet, and all the scales and most of the trees were killed.—*F. J. C.*

Galanthus plicatus. By S. Arnott (*Garden*, January 1909, p. 18). —The author describes *G. plicatus*, and refers to *G. Fraseri*, *Chapelii*, and other garden varieties of this Snowdrop. He thinks they enjoy the same garden conditions as the common Snowdrop, but are liable to die off without apparent cause, and are subject to the fungoid disease which attacks Snowdrops of any species.—*H. R. D.*

Gardenias and their Culture. By Ad. van den Heede (*Le Jardin*, vol. xxii. No. 514, p. 215; July 20, 1908).—The Gardenia was introduced from India in 1754. *G. florida flore pleno* is known to everyone.

A less common variety, *G. f. Fortuneana fl. pl.*, was brought to the Royal Society from China. It bears large white blooms like *Camellia alba plena*, but is seldom seen now. *G. f. radicans* Thunberg, introduced from Japan by Fortune, a dwarf plant, with tiny double flowers, very sweet scented (erroneously termed Cape Jessamine), and *G. florida foliis variegatis* have both died out. Others worthy of culture were *G. amoena* (Simson), with single flowers, pink and white upon the same corolla; *G. citriodora*, pure white lemon-scented flowers; *G. Stanleyana* Hooker, from Sierra Leone (1840), flowers on long tubes like a Datura, white, with purple blotches, and many others are enumerated in this article.

The French culture of *G. florida fl. pl.* differs from the English inasmuch as the flowers are wanted for the Paris winter market. Cuttings are struck in January in greenhouse or hot-bed, and transferred to pots of successively larger sizes, keeping in warm house till June. They are then planted out in heath mould, and left in the open till October, when they should be transplanted to the hot-house and watered freely. This makes them break into full bloom. When the flowering season is over the old plants are burned for firewood. The practice of planting out during the summer lessens the danger of insect pests, to which Gardenias are so liable. It is, however, well to make precautionary use of insecticides.—*F. A. W.*

Germination of Hard Seeds: Hot Water Method. By J. Tixier (*Le Jardin*, vol. xxii. No. 515, p. 235; August 5, 1908).—The author tabulates the results of his experiments for three years with seeds which are prevented by a hard shiny coat from ready germination.

Method. Take quite boiling water, and keep it on the boil. Plunge in a small sieve or packet of wire gauze containing a very few seeds, and leave it in the boiling water for a time determined in each case by the hardness of the seeds. (Next, for small seeds, plunge into cold water; but omit this for large seeds.) Sow in pots, or in the open, according to nature of seed. Only a few should be dipped simultaneously, in order to ensure full action of the boiling water, which dissolves the hard varnish they are coated with. In some cases, where soaked seeds have germinated according to the following table, and the controls (unsoaked) have remained unchanged for three months, a subsequent treatment with boiling water has induced germination at the normal period.

Name of Plant	Length of Immersion	Lapse of Time before Germination
Genista monosperma	10 sec.	9 days
Templetonia glauca	10 ,,	12 ,,
Brachysema latifolia	10 ,,	15–20 days
Chorizema ilicifolia	15 ,,	15–20 ,,
Kennedya Lindleyana	20 ,,	15–25 ,,
K. ovata rosea	10 ,,	15 days
K. rubicunda et *prostrata*	15 ,,	15 ,,
Mucuna pruriens	20 ,,	10–15 days
Tephrosia grandiflora	10 ,,	10 days
Sophora secundifolia	10 ,,	10–20 days
Mimosa Baileyana	10 ,,	12 days
M. podalyriaefolia	20 ,,	12 ,,

F. A. W.

Germination of Seeds (*Le Jardin*, vol. xxii. No. 513, p. 204; July 5, 1908).—M. Demoussy (*Bull. des Comptes-rendus Ac. Sc.*) has calculated the influence of the hygrometric state of the atmosphere on the vitality of seeds. He finds that when it exceeds 0·7 at a temperature of 25° C. many seeds perish: the Cruciferae are among the most resistant. A drier atmosphere is more generally favourable, but chervil, poppy, and Digitalis suffer in dry air. Parsnips can stand a hygrometric depression to 0·3.—*F. A. W.*

Gnetum Gnemon, Embryo of (*Bot. Gaz.* July 1908, pp. 43–50, with 1 plate).—Professor John M. Coulter describes the embryo sac, embryo, and endosperm-development.—*G. F. S.-E.*

Grafting, Modifications in the Constitution of Plants produced by. By M. C. Laurent (*Jour. Soc. Nat. Hort. Fr.*, p. 713, December 1908).—These modifications are of three sorts—in external appearance, in chemical constitution, and in resistance to parasites—and the result of M. Laurent's investigations goes to prove that the actual chemical composition of grafted plants differs from that of either stock or scion on its own roots.—*M. L. H.*

Growth, Laws of. By Georg Ritter (*Beih. Bot. Centralbl.* xxiii. 1^{te} Abth. Heft 3, pp. 273–319).—This is an important biometrical study of the growth in length, in surface and in cubic contents of various plant organs such as internodes, length and size of seeds, dimensions of leaves in various habitats, &c.

The author concludes that, in organic growth, the law of Quetelet is on the whole confirmed. Up to a certain point the process of formation seems to be independent of external conditions. A tendency to exceed or fall short of the mean is regulated by inheritance and must be inherent in the protoplasm.

When material has been obtained from different localities in which selection has been at work, the curves found show distinct differences. New culminating points may appear, and there may be a change in the value of the mean character. When a new maximum has been established by selection, the development may be discontinuous but is still on the same lines, and is only influenced by degrees. This holds of Giantism, Nanism, Malformations, Anomalies, &c.

The author remarks how the so-called Fibonacci series seems to underlie the laws of growth in almost all the cases studied.

These extracts may serve to show the importance of this paper in biometry, but it is exceedingly difficult to give any satisfactory abstract of the author's conclusions without a far larger space than is here available.
G. F. S.-E.

Guatemala Plants, New. By John Donnell Smith (*Bot. Gaz.*, xlvi., August 1908, pp. 109 117).—New species of *Capparis*, *Eurya*, *Picramnia*, *Dalbergia*, *Miconia*, *Clidemia*, *Centropogon*, *Ardisia*, *Stylogyne*, *Gonolobus*, *Solenophora*, *Pilea*, and *Myriocarpa*.—*G. F. S.-E.*

Gum Disease of Citrus Trees in California. By Ralph E. Smith and O. Butler (*U.S.A. Exp. Stn. California*, *Bull.* 200, 1908; with

14 figs.).—Gummosis is a term applied to a condition in which an exudation of gummy sap takes place through the bark. Such a flow of gum is almost always connected with a dying or unhealthy condition of the tree. Such troubles are particularly characteristic of two classes of trees, citrus and stone fruits.

The most important consideration in regard to the control of gummosis is the fact that, since the disease is brought about solely by unfavourable conditions, it can be more easily prevented by avoiding those conditions than it can be cured after once started. In the choice of location heavy wet ground should be avoided, unless it can be drained or improved in some manner.—*M. C. C.*

Helianthus or Salsify. By P. Graebner (*Not. König. Bot., Berlin*, No. 44, p. 107, 108).—In recent years the name of Helianthus or Salsify has been given in commerce to a plant of extraordinary productiveness. It grows to a height of 10 feet, and is used as food for cattle, and the tubers as a vegetable. The author identifies it as *Helianthus macrophylla.*
S. E. W.

Horticultural Society, Indiana, Report of the Proceedings of the year 1907.—As usual in these Transactions of American Horticultural Societies, the apple claims the greatest attention.

In Indiana apparently neither climate nor situation generally is really quite suited to fruit culture, but much can be achieved by intelligent care ; and one paper in this volume recounts the adventures of a special train run over the system of the Baltimore and Ohio South-Western Railroad under the auspices of that Railway Company, the Purdue Experiment Station, and the State Horticultural Society. The train carried lecturers, magic-lantern apparatus, samples of fruit, and diagrams of various sorts, and preached the gospel of fruit-growing in towns, villages, and to hastily summoned buggy-loads of interested farmers at wayside stopping-places through a long strip of Southern Indiana. Other subjects treated of in this volume are melon, potato, cherry, onion, peach, pear, strawberry, and plum culture ; remedies for and prevention of the attacks of garden pests ; marketing fruit, cider and vinegar making, the State inspection of orchards and nursery stock ; and spray mixtures. An account is also given of a successful method of protecting orchards from severe frosts by lighting fires of wet straw or wet stable manure here and there among the trees. On fairly still nights the smoke, mixed with the fog produced by the condensation of the steam from the wet fuel, hangs low over the trees and acts as a screen to check the radiation of heat from the plants, and even increases the temperature of the air to a considerable height above the ground.
M. L. H.

Inflorescence of the Pear and the Apple, Notes on the. By Claude Abrial and L. Chasset (*La Pomologie Française*, August 1908, pp. 243-5).—In apple the terminal flower is the largest and expands first, the lateral flowers expanding from the periphery towards the centre like an ordinary corymb. In the pear, on the contrary, the corymb is indefinite, only the flowers of the periphery are fertile and the central flowers are sterile ; in the Williams' Pear, the flowers of one corymb expand almost all at the same time, the flowers at the outer edge open more widely than those of the centre; the three flowers which terminate the cluster do not expand at the same time, the most central flower expands at the same time as the other flowers of the cluster, while the two which accompany it are still in bud. Only a small number of flowers borne by a tree are destined to give fruits; most act as male flowers producing a considerable quantity of pollen. If the flowers are thinned in the apple the lateral flowers would be cut out, keeping the terminal; if the terminal is missing, leave two or three of the innermost. With the pear, on the contrary, the central flowers would be cut out and the lateral ones left. The number of flowers left would be ruled by the variety, the varieties with small fruit having the most flowers left.

Photographs of pear inflorescences show two central flowers already fallen, and the small flower at the extremity ready to fall, whilst two outside fruits springing from the base of the cluster are well set.

The photographs of apples show the central fruit larger, and stem more fleshy, whilst those at the base, on the contrary, have thin stems and fruit hardy formed.

The hope is expressed that research will be made to find out which varieties of Pears and Apples are the best suited as fertilizers (i.e. pollen producers).—*C. H. H.*

Insecticides—Nicotine, Lead Arsenate, and Paraffin Emulsion. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Tenth Report*, 1909, pp. 35–42).—Further experiments were made in continuation of those detailed in the Eighth Report (p. 83) to test the comparative insecticidal effect of these three washes. Nicotine was not successful with caterpillars generally, and quite inoperative against the winter moth caterpillar, which was completely destroyed by paraffin emulsion (solar distillate 1½ per cent. emulsified with iron solution), as was also the grub of the gooseberry and currant sawfly. The emulsion was much more effective than lead arsenate and did not interfere with the sale of the fruit, but it cannot be used while the trees are in blossom. The experiments were mainly restricted to these two pests. Paraffin emulsions are quite harmless if properly made, but the precaution of churning them up again with a syringe should always be taken (pp. 43–46).
A. P.

Ipomoea mexicana grandiflora alba. By B. Chabaud (*Rev. Hort.*, December 1, 1908, pp. 552, 553).—From the description this Convolvulus is extremely attractive, the flowers being very large and sweetly scented. It flowers, however, in the evening and fades early in the day; but as it flowers for a week after cutting, this drawback is largely discounted. It is also known as the 'giant white Ipomoea.'—*C. T. D.*

Iris germanica. By P. de Vilmorin (*Jour. Soc. Nat. Hort. Fr.*, p. 653, November 1908).—A note on the parentage of the *Iris germanica* as we know it and a description of some new varieties obtained by the author.—*M. L. H.*

Iris germanica macrantha. By Ph. de Vilmorin (*Rev. Hort.* December 1, 1908, pp. 544, 545; coloured plate).—Two very beautiful varieties are figured: 'Isoline,' standards very wide, white, tinged with violet at margin, yellowish at base, falls long and decumbent, light violet red, with brown streaks at base; and 'Diane,' plant somewhat dwarf, but flowers equally large, standards light lilac, falls widespreading and darker in tint with brownish-orange basal stripes.—*C. T. D.*

Japanese Maples. By J. Clark (*Gard. Chron.*, No. 1,138, p. 273, October 17, 1908). The author of this paper says that "many species of *Acer* are indigenous to Japan, but the term 'Japanese maple' is ordinarily applied in gardens to *Acer japonicum* and *A. palmatum* together with their respective varieties. The former of these was introduced to this country, according to Loudon, in 1820, and the latter some forty years later. These maples are perfectly hardy, not fastidious as to soil and situation, provided the latter is not too shaded. They are liable to be cut by late spring frosts, but they quickly recover from its effects." A selection of Japanese maples that can be recommended to the ordinary planter, some fifteen in number, is then given with a short description of each variety. —*G. S. S.*

Java; the Virgin Forest of the Equator. By M. Treule (*Ann. Jard. Bot. Buit.*, vol. vii., pp. 144–152).—In a primeval forest in the rainy district of the west of Java the leaves of the giant trees are covered with lichens and mosses; the branches bear innumerable orchids, Gesneraceae, Piperaceae, and ferns. The trunks of the trees support climbers. Each giant tree exhibits a combination of all kinds of vegetable forms: a rich and varied flora. The undergrowth of the forest abounds in tree ferns, palms, *Pandanus*, and Musaceae, and in their shade flourish innumerable herbaceous plants. The whole is traversed by lianas and aërial roots. Not only a struggle for existence takes place in the virgin forest, but also on the other hand co-operation and federation.

In an artificial wood planted forty years ago solely with *Schima Noronhae* (in a similar situation to the virgin forest just mentioned), 140 species of plants occur in an area of 4 hectares. The complete absence of lianas and epiphytes formed a striking contrast to the primeval forest.

S. E. W.

Kaulfussia and Gleichenia, The Prothallia of. By D. H. Campbell (*Ann. Jard. Bot. Buit.*, vol. vii., pp. 69–99; 8 plates).—The prothallium of *Kaulfussia* is larger than that of the other Marattiaceae, but closely resembles it in structure. An endophytic fungus is always present. The antheridia are restricted to the lower surface of the midrib. In their large size, as well as in the larger spermatozoids, they resemble *Ophioglossum*. The development of the embryo is similar to that of the other Marattiaceae. The cotyledon emerges from the upper surface of the prothallium and resembles that of *Ophioglossum* in form and venation. The prothallium of *Gleichenia* possesses a massive midrib. An endophytic fungus is always present. In *G. laevigata* the antheridia occur on both sides of the prothallium; in all other species they are confined to the ventral surface. *G. laevigata* has the largest antheridia, and *G. polypodioides* the smallest. The embryo appears to resemble in its early divisions that of the Polypodiaceae.—*S. E. W.*

Light Sense. By Dr. P. Schurhoff (*Beih. Bot. Centralbl.* xxiii. 1te Abth. Heft 1, pp. 14–26; 2 plates).—Finds in six species of *Peperomia* distinct evidence of a light-collecting apparatus. This consists, in some cases, of glandular hairs with the waterstoring cells which belong to them, or of secretory epidermis cells with the hypodermis cell, or of the basal cells of hairs with hypodermis cells. In one case there are papillary epidermis cells.

The light is always reflected upon the chloroplast, sometimes in consequence of the shape of the cell whose upper convex wall functions as a lens, or in other cases because the light rays collected by the lens-shaped upper portion of the cell are dispersed by a crystal of calcium oxalate and so thrown upon the chloroplasts.

Whether these structures are intended merely to condense the light or are really rudimentary light organs like the ocelli of some of the lower animals remains an undecided question.

If they are only light-condensers one would expect the chloroplasts to change position when the light is thrown upon them from below. It was found, by experiment, that they retain their position when the light is thrown on the under surface, which is rather in favour of the theory that they act as ocelli.

The distribution of the crystals would seem to show that the stimulus, if any, is transferred by the prosenchymatous cells of the vascular bundles.—*G. F. S.-E.*

Lonicera Giraldii (*Bot. Mag.* tab. 8200).—Nat. ord. *Caprifoliaceae*, tribe *Lonicereae*. China. Shrub with branches tawny-tomentose when young; leaves lanceolate, 1–3½ inches long; corolla tube ½ inch long, crimson, yellow pubescent without.—*G. H.*

Mendelism and Cytology (*Bot. Gaz.* July 1908, pp. 1–34, with 3 plates).—Mr. Reginald Ruggles Gates contributes a detailed study of reduction in *Oenothera rubrinervis*.—*G. F. S.-E.*

Mercurialis, Ipomoea, and Cuscuta (*Beih. Bot. Centralbl.*, xxiv. Erste Abth., Heft 1, pp. 90–98).—Herr Friedrich Hildebrand records visits of insects to the male flowers of *Mercurialis annua* and *per.*, but saw none of them on the female flowers. He also describes the extraordinarily sudden opening of the flowers of *Ipomoea grandiflora*, which occurs in the evening after a hot and sunny day. The time of opening in the evening depends upon when the sunlight acted on the buds in the morning. He also gives a list of the host plants upon which *Cuscuta europaea* and *C. lupuliformis* were observed. Both ordinary nettles and even a *Campanula* were attacked by them.—*G. F. S.-E.*

Monk's Rhubarb. By Ernst H. L. Krause in Strassburg (*Beih. Bot. Centralbl.*, xxiv., Heft 1, pp. 6–32).—Under the title of "Lapathum and Patientia" the author investigates the history of *Rumex patientia*. His conclusions are as follows:—

The Greeks from about 400 B.C. used a *Rumex* which was eaten as a vegetable. This plant seems to have been *Rumex graecus*, which is no longer in cultivation, but wild plants are still collected and used as a vegetable. A polymorphous series of species nearly related to it still exist in the Near East, and a few of them (besides *graecus*) extend into the Balkans.

About the first century of our era the Romans obtained this vegetable from Greece, but even in the Middle Ages its cultivation had been abandoned, though a tradition of it still existed. The form cultivated in the Netherlands (which escaped the thorough destruction of the lands of the Allemanni during the barbarian invasions) is not *Rumex graecus* but *R. patientia*, which may be a hybrid between the former and some wild species (perhaps *R. crispus*). This is very like the older cultivated plant, but better suited to a European climate. In the beginning of the sixteenth century the Franciscan monks used the roots of *R. patientia* instead of rhubarb, and cultivated it in the monastery gardens. So it came into gardens and into botanical hands. It was soon found to be unsuited for medicinal purposes. *R. alpinus* was used by the apothecaries for a longer period. In England it has either remained over from ancient times or been introduced. It has been eaten as a spinach since the seventeenth century, and has been distributed to many countries.

G. F. S.-E.

Mutants. By Dr. Karl Domin (*Beih. Bot. Centralbl.* xxiii. 2te Abth., Heft 1, pp. 15–25).—Describes *Potentilla verna* L. *mutant monophylla*, *Primula officinalis* (L.) Hill *mutant horticola*, and *Picea Omorilla* (Panč.) Willk. var. *Fassei* Midloch.

The leaf of the above *Potentilla* has but one leaflet, but it scarcely differs in other respects from *P. verna*. The author considers it to be an atavistic form resembling the original ancestor of *P. verna*.—*G. F. S.-E.*

Nigella integrifolia (*Bot. Mag.* tab. 8245).—Nat. ord. *Ranunculaceae*; tribe *Helleboreae*; Turkestan. Herb annual, 1 foot high; leaves 3–9 palmatipartite, lobes 1¼–2 inches long; flowers blue, 1 inch diameter.

G. H.

Nitro-bacterine, an Experiment with. By C. T. Gimingham, A.I.C.—The following experiment with nitro-bacterine was carried out at Wye College in 1908.

The crops chosen were three varieties of ordinary garden peas and one of broad beans. The object of the experiment was to discover whether the use of the inocculating material under ordinary conditions of culture resulted in an increased yield of marketable produce. The experiment was carried out on two types of soil:—

(1) A soil which had been previously well-trenched and manured, and was prepared and intended for vegetable culture.

(2) A very poor thin soil, just overlying the chalk and very deficient in organic matter. This was dug over just before sowing.

In the case of soil (1) it was hardly to be expected that much good would result from inoculation unless the bacteria introduced should prove of much greater virulence than those already present in the soil; for in this case there was a fair amount of nitrogen present in the soil, and, moreover, peas had recently been grown there with success.

Soil (2), however, seemed to be just the type of soil on which inoculation should prove of value. No leguminous crop had been grown there for many years, and there was extremely little organic matter present; moreover, lime and the necessary mineral foods were present in sufficient quantity. It would seem to fulfil the conditions mentioned on p. 10 of Professor Bottomley's "Seed and Soil Inoculation," under which inoculation is stated to be *necessary.*

No manures were used in connection with the trial.

On each type of soil four rows of each variety were sown, each row being 21 feet long, and in every case a row sown with inoculated seed alternated with a row sown with untreated seed. Thus at the end of the experiment the weights of produce from two rows inoculated and two rows uninoculated of each variety were obtained. The varieties of peas employed were Carter's 'Eight Weeks,' 'Early Morn,' and 'Yorkshire Hero.' The culture fluid was prepared in the laboratory with all care to prevent unnecessary contamination and precisely according to the directions given. The temperature was regulated correctly, and the liquid used for the inoculation of the seed as soon as it appeared sufficiently cloudy. The inoculation was performed by immersing each lot of seed, contained in a small muslin bag, into the liquid until thoroughly wet. The seed was then spread out in a cool shady place until quite dry and then planted, the same amount of seed being used for planting each row.

At about the time of flowering plants here and there were taken up from corresponding rows, and their roots examined with regard to the formation of nodules. Apparently throughout, nodules were formed quite as abundantly on the uninoculated plants as on those inoculated. No differences were observable at any period between corresponding rows on the same ground, whether with regard to general growth or to the time of coming to maturity.

The following tables give the results obtained, showing the total weight of pods from each row expressed in grams. (The rows of 'Eight Weeks' peas on the good soil were neglected, as just before picking they were somewhat damaged by pigeons) :—

SOIL MANURED AND TRENCHED.

Variety.	Seed inoculated.			Seed not inoculated.			Increase or decrease.
	Row 1.	Row 3.	Total.	Row 2.	Row 4.	Total.	
	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.
Early Morn .	3,838	4,172	8,010	4,461	5,428	9,889	– 1,879
Yorkshire Hero .	7,107	7,188	14,295	7,095	7,685	14,780	– 485
Broad Beans .	5,715	6,376	12,091	6,806	6,336	13,142	– 1,051

POOR SOIL UNMANURED.

Variety.	Seed inoculated.			Seed not inoculated.			Increase or Decrease.
	Row 1.	Row 3.	Total.	Row 2.	Row 4.	Total.	
	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.
*Eight Weeks .	3,216	3,274	6,490	2,874	3,252	6,126	+ 264
Early Morn .	2,740	2,551	5,291	3,056	2,638	5,694	– 403
Yorkshire Hero .	5,660	5,437	11,097	5,908	5,852	11,760	– 663
Broad Beans .	4,450	4,648	9,098	5,694	4,733	10,427	– 1,329

It will be seen that in only one case * is the total weight of the produce from the two inoculated rows of any variety greater than that from the two uninoculated rows. The weights of pods of the various rows of each variety show, indeed, remarkably little variation when it is remembered that a difference of 250 grams represents only about a handful of pods.

There was no evidence to show that the slightest benefit had been obtained by the use of "Nitro-bacterine" on either type of soil. The experiment was not on a large scale, but it indicates the kind of results to be expected from the use of this material under ordinary garden conditions in this country, and serves to confirm very many results obtained last summer.—*C. T. G.*

Nuts, and their uses as food. By M. E. Jaffa (*U.S.A. Dept. Agr. Farm., Bull.* 332 ; Oct. 1908).—Nuts are becoming more important as an article of food in the States. The native kinds are being improved, and foreign more widely cultivated.

Nuts contain much fat and little water, the richest being the pecan—70.7 per cent. of fat. The concentrated nature of the food is probably the reason for their being considered indigestible, and nut protein is slightly less digestible than that of meat, but this may be remedied by sufficient mastication. The water in nuts is 3 to 5 per cent. compared with 50 to 70 per cent. in meat.

In general, nuts rich in protein and fat (brazil-nut, walnut, pecan and cocoa-nut) should be used with carbohydrate foods, such as bread, fruit, and green vegetables ; whereas those containing starch and sugar (chestnuts, &c.) should be eaten with meat, milk, cream and eggs.

Nuts should be used as a staple food, and not merely as an addition to a hearty meal, but a nut and fruit diet is not recommended to the majority of mankind in place of the usual mixed diet.

Oily nuts (not containing much starch) such as walnuts, almonds, filberts and brazil-nuts are useful in cases of diabetes, in the form of meal and flour. Nut butters (made from wasted peanuts) are much used by vegetarians, but they become rancid very soon. They are not identical with cocoa butter, or cocoa-nut butter. Nut milk also differs from milk of cocoa-nut. The former made from a species of *Canadium* (seed of the Chinese olive) or Java almond, is used with some success as an emulsion or infants' food.

Many sweetmeats are made from nut products.

Among the Tuscan peasants, chestnut flour is largely used in the form of porridge, cakes and bread. Acorns and horse-chestnuts are used by American Indians as food, after a preliminary process of leaching, to remove tannin and poisonous matters.

Nuts are not economical as food compared with meat, with the exception of peanuts. Ten cents spent on these will purchase twice as much protein and six times the energy as the same amount spent on steak. Peanuts and dried beans supply more protein and energy than any other food.

Amongst the less well-known 'nuts' are the following :

Pinenuts—used in India, Italy and Southern Europe.

Lichi of China—a raisin-like fruit surrounded by a shell.

Ginkgo of China (fruit of maidenhair tree)—nearly always used cooked.

Water chestnut of Asia (*Trapa bispinosa*) —seed shaped like two horns.

Another water chestnut (*Eleocharis tuberosa*) the corm or bulb is eaten.

Seed of Chinese olive (*Canarium*)—oily but palatable.

Another species of *Canarium* (Java almond)—used to make emulsion for infants' food.

Candle-nut of Tropics—eaten after being thoroughly dried.

Paradise-nut of South America.

Cream-nut of South Africa.

True 'Butternut' of the Tropics.

Cashew nut of the Tropics—must be roasted or is poisonous.

Kingsland Chestnut.

The Tabebuia from Zanzibar—seeds of a pumpkin-like fruit, oily and fairly palatable—is grown at Porto Rico.—*C. H. L.*

Oak Disease (Oidium quercinum). By P. Heriot and L. Daniel (*Le Jardin*, vol. xxii. No. 517, p. 265; September 5, 1908).—In 1907-08 the oaks in France were attacked by a new pest, *Oidium quercinum*, Thiénsen, which covers the young shoots with a white powder, consisting of ovoid spores (conidia) arranged in chains like those attributed to other Oidia. Up to September 1908 (date of article), the nature of the fungus had not been detected, but it seems probable that it is *Microsphaera alni* which abounds on oak-leaves in the United States, and has recently been reported from Geneva. Most species of Oak appear to be attacked by it, *e.g. Quercus sessiflora*, *pubescens*, *Toza*, *Ilex*; it has not yet been detected on *Q. Suber*, and *coccifera*. It is suggested that the disease may have originated in imported American oaks, but no observations have been made as to whether these were the first attacked. No adequate remedy is known, since it is impossible to cover a forest with sulphur like a vineyard.

M. Daniel in an interesting note points out that the trees beset by the parasite are those which have been recently pollarded. In the Departments of which he writes this takes place every seven years. Some trees are completely pollarded, others are allowed to retain a central shoot, while those destined for the carpenter are not trimmed at all, but are allowed to develop freely. Now the fungus takes complete possession of trees lopped in the previous autumn, when the mutilated tissues contain a superabundance of water with no foliage to carry it off, while in proportion as new growth has been made and there is a return to the normal proportions of trunk and boughs, the parasite has so much the less effect. The moral, according to M. Daniel, is obvious, and the remedy lies in more judicious foresting.—*F. A. W.*

Odontoglossum Leaf-spot. By M. C. Potter, M.A., F.L.S. (*Gard. Chron.* 1909, i. p. 145).—A full account, with four figures of *O. Uro-Skinneri* affected with this disease.—*G. W.*

Olearia. By S. Mottet (*Le Jardin*, vol. xxii. No. 517, p. 260; September 5, 1908, 3 figs.).—The genus Olearia, known to us for the most part by *O. Haastii* only, includes over eighty species, but only three or four of these are worth cultivating. *O. macrodonta* (syn. *dentata*) is an interesting plant, with crinkled thorny leaves like a Holly, and corymbs of single white flowers, inserted on long peduncles at the apex of the previous year's growth. It is, however, only half-hardy. *O. Eurybia Gunniana* is comparatively hardy, and from its dwarf habit well suited for the rock garden. *O. Forsteri* resembles *O. macrodonta*; *O. Traversii* is much taller, with shining oval green leaves, woolly on the under-surface, numerous white flowers on slender pedicels forming a dense corymb; *O. furfuracea*, *O. insignis*, *O. ramulosa*, and *O. nitida* may also be mentioned. All these species come from New Zealand, and all are easily propagated by cuttings of the young shoots at the end of the summer. Strike in light soil, under bell-glasses, and shaded.—*F. A. W.*

Oligobotrya Henryi (*Bot. Mag.* tab. 8238).—Nat. ord. *Liliaceae*; tribe *Polygonateae*; China. Herb, stem 3 feet high; leaves sessile, ovate-oblong to 2 inches broad; raceme terminal; perianth white or pale yellow, or (var. *violacea*) with a violet tube, ½ inch long.—*G. H.*

Olive Culture, Dry-Land, in Northern Africa. By Thomas H. Kearney (*U.S.A. Dept. Agr., Bur. Pl. Ind., Bull.* 125, 1908; illustrated).—The use of trees as a drought-resisting crop in the dry lands of the States has up till now not been fully considered. The olive would seem especially suitable for cultivation in the arid parts of California, Texas, and Arizona, to judge by the experience of the Old World. Although now practically a sandy desert, there is no doubt that Algeria and Tunis, before the Arab conquest, used to support large and flourishing populations, whose wealth was derived in the early centuries of the Christian era from olive orchards and the production of oil.

On the east coast olive culture never completely disappeared. Sfax, a flourishing seaport town, is surrounded by olive orchards to a distance of twenty or more miles, and contains many crushing mills, both native and European. The trees are set out about 70 feet apart each way, and pruned to admit the greatest amount of air and sunshine.

The rainfall averages 9 inches a year, and is often less for a number of years in succession, so that irrigation is out of the question.

The ground is kept quite clean when the trees are once in bearing.

They begin to bear productively when about ten years old, increasing till twenty-five years, when they should be in full bearing, and with good treatment they so remain till fifty years, when they begin to decline.

The average yield of oil from each tree in full bearing is about six gallons.

The best means of cultivation is that by contract with native proprietors, more economical and effectual than by European management.

(The summary at end of pamphlet is instructive.)—*C. H. L.*

Orchard Survey of Jackson County. By C. I. Lewis, S. L. Bennett and C. C. Vincent (*Oregon Agr. Exp. St. Bull.* 101).—To those who are interested in fruit culture this work is of special value. From a small beginning orcharding in Jackson County has had a wonderful development in the past fifteen years, there being at present 473 orchards containing 9,675 acres. The methods of cultivation, soils, irrigation, pruning and preparing the fruit for market are all clearly related. Yellow Newtown, Spitzenburg, and Jonathan would appear to be the most widely grown amongst apples, while of pears Doyenné du Comice, Bartlett, and Beurré Bosc are the kinds most commonly cultivated.

As regards prices these have been steadily on the increase for the past few years, while with pears the increase in value has been phenomenal.—*A. D. W.*

Orchid Portraits.—The following orchids have been figured recently :—

Angraecum Augusti	*Gard. Chron.* 1909, i. p. 89.
A. sesquipedale	*Gartenfl.* 1909, p. 55, fig. 4.
*Brassocattleya Cliftonii	*Gard. Chron.* 1909, i. p. 34, fig. 23.
*B.-c. Digbyano Mendelii perfecta	
*Brassocattlaelia Cooksonii	
Bulbophyllum Dayanum	*Gard. Chron.* 1909, i. p. 194, fig. 82.
B. lemniscatoides	*Gard. Chron.* 1909, i. p. 68, fig. 38.
*Calanthe × Angela	*Journ. Hort.* 1909, i. p. 3.
Calypso borealis	*Country Life*, 1909, p. 194.
Cattleya intermedia monstrosa	*Orch. Rev.* 1909, p. 41, fig. 4.
C. Loddigesii var. Harrisoniae	*Journ. Hort.* 1909, i. p. 273.
*C. × Maggie Raphael, Westonbirt var.	
C. Percivaliana, Charlesworth's var.	*Gard. Mag.* 1909, p. 43.
*C. × Robert de Wavrin	
*C. Schröderae var. Alexandra James	
*C. Schröderae var. Irene	
*C. Schröderae var. Mrs. F. Sander	
*C. Schröderae var. The Baron	
*C. Trianaei var. Grand Monarch	
*C. Trianaei var. Mooreana	
C. Warscewiczii var. Sanderiana	*Journ. Hort.* 1909, i. p. 69.
Chrondropetalum Fletcheri	*Gard. Chron.* 1909, i. p. 9, fig. 12.
Cycnoches densiflorum	*Orch. Rev.* 1909, p. 104, fig. 9.
*C. peruvianum, Tracy's var.	
C. maculatum	*Gard. Chron.* 1909, i. p. 26, fig. 19.
C. pentadactylon	*Gard. Chron.* 1909, i. p. 27, fig. 20.
C. Warscewiczii	*Gard. Chron.* 1909, i. p. 29, fig. 21.
Cymbidium × eburneo-Lowianum	*Gard. Mag.* 1909, i. p. 5.
*C. × Woodhamsianum, Orchidhurst var	
Cypripedium × Antinous	*Gard. Mag.* 1909, i. p. 91.
C. × Bianca superbum	*Journ. Hort.* 1909, i. p. 25.
*C. × Bridgei magnificum	*Journ. Hort.* 1909, i. p. 229; *Gard. Mag.* 1909, p. 184.
*C. × Curtmannii	
C. × Euryades, New Hey Hall var.	
C. × Earl of Tankerville	*Gard. Chron.* 1909, i. p. 101, fig. 49.

C. insigne Lagerae	*Orch. Rev.* 1909, p. 40, fig. 3.
*C. × Leander, Exhims var.	
C. × Mrs. Wm. Mostyn	*Journ. Hort.* i. p. 157.
*C. × Our Queen	*Gard. Mag.* 1909, p. 192.
C. pubescens	*Country Life*, 1909, p. 194.
C. × Tracyanum	*Gard. Mag.* 1909, i. p. 260.
Dendrochilum glumaceum validum	*Orch. Rev.* 1909, p. 81, fig. 8.
*Dendrobium × Lady Colman	
*D. × Schneiderianum, Westonbirt var.	*Gard. Chron.* 1909, p. 251; *Journ. Hort.* 1909, i. p. 319.
D. speciosum	*Gard. Chron.* 1909, i. p. 219, fig. 94.
*Epilaelia Lionetii	
Eria hyacinthoides	*Bot. Mag.* t. 8229.
Habenaria dilatata	*Country Life*, 1909, p. 194.
Laeliocattleya × Elinor	*Gard. Chron.* 1909, i. p. 120.
L.-c. × Felicia	*Gard. Chron.* 1909, i. p. 100, fig. 48; *Gard. Mag.* 1909, p. 101.
*L.-c. × Fred. Boyle var. Kerchovae	*Gard. Mag.* 1909, i. p. 293.
*L.-c. × Goldcrest	
*L.-c. × Goldfinch superba	
*L.-c. Lustre var. gigantea	*Gard. Chron.* 1909, i. p. 168.
*L. Pizarro, Westonbirt var.	*Gard. Chron.* 1909, i. p. 232.
Lycaste Skinneri	*Garden*, 1909, i. p. 99.
Masdevallia ignea	*Gard. Mag.* 1909, i. p. 283.
Macodes Petola	*Orch. Rev.* 1909, p. 73, fig. 6.
*Miltonia Bleuana, Sander's var.	
*Odontioda × Bradshawiae, Cookson's var.	*Gard. Chron.* 1909, i. p. 174, fig. 73; *Gard. Mag.* 1909, p. 211; *Journ. Hort.* 1909, i. p. 252; *Garden*, 1909, i. p. 137; *Orch. Rev.* 1909, p. 113, fig. 10.
O. × chelsiensis	*Orch. Rev.* 1909, p. 48, fig. 5; *Journ. Hort.* 1909, i. p. 47; *Gard. Mag.* 1909, p. 70.
O. × Goodsoniae	*Gard. Chron.* 1909, i. p. 195, fig. 83.
*O. × Ernest Henry	
O. × Keighleyensis	
*O. × Lutetia	*Gard. Mag.* 1909, p. 159; *Journ. Hort.* i. p. 207.
*Odontoglossum × ardentissimum var. Phoebe	*Gard. Chron.* 1909, i. p. 132, fig. 57; *Gard. Mag.* 1909, p. 134; *Journ. Hort.* 1909, i. p. 137.
*O. crispum Angela	
O. crispum Fowlerianum	*Gard. Chron.* 1909, i. p. 211, fig. 90.
O. crispum × anthotes var. Mrs. F. M. Ogilvie	*Gard. Chron.* 1909, i. p. 258, fig. 110.

O. × crispo-Harryanum	*Gard. Chron.* 1909, i. p. 133, fig. 58; *Gard. Mag.* 1909, p. 144.
*O. × Dreadnought	
*O. × loochristiense aureo-fulvum	
*O. × Magali Sander	*Gard. Chron.* 1909, i. p. 37, fig. 25; *Gard. Mag.* 1909, i. p. 33.
*O. × percultum, Cookson's var.	
O. × Rolfeae	*Gartenfl.* 1909, p. 57, t. 1580.
O. Rossi majus	*Journ. Hort.* 1909, i. p. 343.
O. × Smithii	*Orch. Rev.* 1909, p. 80, fig. 7.
*O. × Sylvia, Westonbirt var.	
*O. × Theodora	*Gard. Mag.* 1909, i. p. 339; *Gard. Chron.* 1909, i. p. 269, fig. 115.
O. × tripudians × Pescatorei Charlesworthii	*Orchis*, 1909, p. 10, fig. 1.
O. Wyonianum	*Gard. Chron.* 1909, i. p. 211, fig. 89.
Orchis rotundifolia	*Country Life*, 1909, p. 194.
Oncidium corynephorum	*Journ. Hort.* 1909, i. p. 91.
O. Kramerianum	*Gard. World*, 1908, p. 779.
O. sarcodes	*Journ. Hort.* 1909, i. p. 92.
Paphiopedilum niveum var. Gloria Mundi	*Orch. Rev.* 1909, p. 9, fig. 1.
Phalaenopsis Schilleriana	*Journ. Hort.* 1909, i. p. 367.
*Sophrocattleya Thwaitesae	*Journ. Hort.* 1909, i. p. 295.
*Sophrocattlaelia Olive	
*S.-c.-l. Marathon var. Vesuvius	*Journ. Hort.* 1909, i. p. 113.
Spiranthes Romanzoffiana	*Country Life*, 1909, p. 194.
Vanda coerulea	*Orch. Rev.* 1909, p. 17, fig. 2.; *Gard. Chron.* 1909, i. p. 264.
V. Watsonii	*Rev. Hort. Belge*, 1909, p. 90.

G. W.

* A painted portrait of those having an asterisk prefixed is preserved in the Royal Horticultural Society's collection.

Orchids and their commensal fungi: Evolution in Symbiosis. By N. Bernard (*Ann. Soc. Nat.*, vol. ix., No. 1, pp. 1–64; 12 figs.).—In the majority of orchids, symbiosis is intermittent in the adult state, but is absolutely necessary for germination. In the more perfect degrees of symbiosis illustrated among orchids, e.g., *Neottia Nidus-avis*, not only will the seeds refuse to germinate in the absence of the fungus, but the orchid cannot live without its symbiotic fungus.

Rhizoctonia repens, *R. mucoroides*, and *R. lanuginosa* were obtained from the roots of orchids.—*S. E. W.*

Orchids from Samoa, New. By F. Kränzlin (*Not. König. Bot., Berlin*, No. 44, pp. 109–111).—*Bulbophyllum praealtum*, *Dendrobium Vaupelianum*, *Eria curvipes*, and *Calanthe Vaupeliana* occur in Samoa.

S. E. W.

Orchids in the Rockies. By Julia W Henshaw (*Country Life*, 1909, p. 194).—Mention is made of twenty-three species of Orchidaceae in the Rocky and Selkirk mountains of Canada. Five excellent photographs are given.—*G. W.*

Packing Fruit for Export. By J. G. Turner (*Jour. Agri. Victoria*, February 1908).—The following are varieties of fruit found most suitable for export from Victoria, Australia.

Apples.—Jonathan, Cleopatra (or New York Pippin), Munroe's Favourite (or Dunn's Seedling), London Pippin (or Five Crowns), Statesman (or Chandler), Rome Beauty, Newtown Pippin, Esopus Spitzenberg, and Ribston Pippin.

Pears.—Vicar of Winkfield, L'Inconnue, Winter Nelis, Josephine de Malines, Broom Park, Eyewood, and Uvedale's St. Germain.

The cost of packing, shipping and selling a bushel case is given as follows :—

	s.	*d.*
Cases, best kauri planed per case	1	1
Wrappers		1
Grading, packing and nailing		2
Rail freight		3
Ocean freight	2	10
Insurance and commission		7
Supervision		3
Total per case	5	3

The measurement of the bushel box inside is 18 × 14 × $8\frac{7}{8}$ inches containing $2,236\frac{1}{2}$ cubic inches.

Pears have been successfully packed in trays, one layer in each tray three of these trays are then cleated together to make a single package; in some cases cardboard divisions are employed. Ventilation holes are bored through the cases and cardboard shelves, to allow the passage of air. Picking, cooling, grading, packing and the branding of the cases are described.—*C. H. H.*

Paraffin, Action of, on Tree Roots and on Soils. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Tenth Report*, 1909, pp. 22–25).—Trees sprinkled with a quart of various kinds of paraffin when not in leaf showed no ill effects as regards their growth and general condition, while the crops on trees so treated were the best on the farm. Apart from the question of possible direct benefit, the results of the experiments suggest the possibility of treating the roots and the soil for various diseases and insect pests by means of paraffin.—*A. P.*

Paraffin, Spraying Trees in Leaf with. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Tenth Report*, 1909, pp. 13–21).—The heavier oils, such as solar distillate, eventually killed both leaves and branches, while the lightest oils, such as petrol, scorched the leaves immediately, but the branches recovered. Those of intermediate character, such as the best lighting oils, did very little damage to the foliage.—*A. P.*

Peach Aphis (Myzus persicae, Sulz.). By E. P. Taylor (*Jour. Ec. Entom.*, I. (1908), Pt. 2, pp. 83–91).—This aphis, which attacks peach in Europe, has also been found in America on nectarine, plum, prune, cherry, choke-cherry, sand-cherry, pear, apple, willow, rose, turnip, rape, cabbage, tomato, potato, *Malvastrum*, dock, *Amaranthus*, mustard, shepherd's purse, *Antirrhinum*, carnation, rhubarb and egg-plant. The eggs are shiny black, small and oval, and are to be found near the tips of the shoots. The aphides are at first of a dark green colour and later assume shades of pink and salmon. As with most aphides the forms hatched from the eggs are viviparous and produce numbers of young. After feeding on the leaves, &c., a large proportion of them acquire wings, and about the beginning of June (in Colorado) desert the peach for some of the other plants mentioned above, returning to the peach in September or October. Larvæ of Syrphus flies and lace-wings and ladybirds prey on the aphides, and a small hymenopterous parasite destroys large numbers, while various birds feed upon them. The whole life history is very carefully outlined in the paper. The best results in controlling the pest were obtained by spraying with paraffin emulsion containing 5 per cent oil, Scalecide diluted 1 part to 20 parts cold water, or tobacco decoction made by steeping 1 lb. of leaf tobacco or 2 lb. strong tobacco dust in 4 gallons water, *just before the buds burst*. It is recommended that all prunings should be burned.—*F. J. C.*

Peach, Apricot, and Plum Kernel Oil Manufacture in the United States. By F. Rabak (*U.S.A. Dept. Agr., Bur. Pl. Ind., Bull.* 133, October 1908).—Large quantities of stoned apricots and peaches and a certain amount of stoned plums are annually sold in the United States. The kernels of all these fruits are almost identical chemically with those of the sweet and bitter almonds, from which the almond oil of commerce is extracted, and as apricot stones from America are already exported abroad, and the extracted oil returned to America as pure almond oil, it is suggested that a native industry might be created, and the American demand for almond oil be supplied from the home orchards.

M. L. H.

Peach Die Back (*Dep. Agr. N.Z.*, 16th Report, 1908, p. 112).—This disease was formerly attributed to *Clasterosporium carpophilum*; but during studies of 'Peach-scab' it has become apparent that the fungus is identical with *Coryneum Beyerinckii.* Spraying with Bordeaux mixture soon after the leaves have fallen is followed with good effects. When infection has been established the spores are developed in large numbers at the first sign of spring growth, and if the spraying is delayed until this period considerable damage through "die back" will be experienced.—*M. C. C.*

Peatmosses, Poisoning in. By Alfred Dachnowski (*Bot. Gaz.*, xlvi., August 1908, pp. 130–143; with 6 figures).—The author has carried out some very interesting experiments on the toxic property of bogwater and bogsoil. He alludes to the great importance of the reactions upon habitat of the plants themselves. He collected samples of bogwater from a small "bog island" (apparently a sphagnum and cottongrass swamp with an outer zone of alder, willow and *Acer rubrum*).

Marchantia gemmae, wheat, Indian corn, and several other plants were then grown in this bogwater after it had been variously treated. In one series the water was aërated, in another treated with dry calcium carbonate, in another shaken with lampblack and filtered; other sets were grown in the untreated bogwater and in an extract (4 gm. of bogsoil in 400 ccm. of distilled water).

The experiments point to an injurious effect of some water-soluble substance in the bogwater which can be corrected by a method of aeration and by the use of calcium carbonate and lampblack. This is more marked in the sphagnum than in the maple-alder zone.

Those plants which grew in the bogsoil extract were stunted in root-formation, whilst their leaves were reduced in area, thicker, and with revolute margins—that is, distinctly xerophilous in character. This he explains as due to a reduced transpiration current in consequence of the poisonous character of the soil. The beneficial effect of small doses of poisons comes out in some of the $CaCO_3$ and carbon-black solutions. *Phaseolus* seedlings grown in these closely resembled similar cultures in a ·0001 strychnin or atropin sulphate solution. The width of the annual rings of wood in *Acer rubrum*, both from the ordinary woodlands and from the bog island zone already mentioned, was measured and tested biometrically. The mode was 3 mm. width from the bog island, and only 2 mm. from the ordinary woods. There were also very marked differences in mean, standard deviation, and coefficient of variability. The author seems to explain this also by the stimulation due to minute proportions of poisonous solution in the bogwater.

We find, however, the following sentence: "It may be readily questioned whether part of the response arises from a deficiency of oxygen in the soil." This, of course, is the usual explanation of the peculiarities of peat-floras, but whether the author means by this sentence to admit this explanation or not is not particularly obvious.—*G. F. S.-E.*

Pecan, Cultivation of. By Prof. H. S. Van Deman (*U.S.A. Stn. Hort. Soc., Louisiana, Ann. Rep.* 1908; pp. 18-94).—The author considers the pecan to be the most valuable orchard tree for cultivation in Louisiana. He recommends that they should be grown one hundred feet apart and cotton, Irish potatos, or corn grown between them.—*F. J. C.*

Pentadesma Kerstingii, Seed of. (*Not. König. Bot., Berlin*, No. 44, p. 102).—These seeds are rich in fat.—*S. E. W.*

Pinus Bungeana (*Bot. Mag.* tab. 8240).—Nat. ord. *Coniferae*; tribe *Abietineae*; North China. Tree 60–100 feet high, crown pyramidal or ovoid; leaves in threes; cone when mature 1½ 2 inches long; scales rhomboidally thickened at the tips.—*G. H.*

Pitophora. By A. Ernst (*Ann. Jard. Bot. Buit.*, vol vii., pp. 18-55; 4 plates).—The growth, development, and structure of *Pitophora sumatrana* are described.—*S. E. W.*

Plants containing Cyanogen derivatives. By A. W. K. De Jong (*Ann. Jard. Bot. Buit.*, vol. vii., p. 1–17).—The leaves of *Pangium edule* contain the glucoside gynocardine, which is also present in the seeds of *Gynocardia odorata*. The glucoside is decomposed by the action of an enzyme liberating hydrocyanic acid. The leaves also contain a large proportion of the hydrocyanic acid in the free state.

The leaves of *Phaseolus lunatus* contain the glucoside phaseolunatine ($C_{10}H_{17}O_6N$).—*S. E. W.*

Podocarpus, Staminate Cone and Male Gametophyte of. By L. Lancelot Burlingame (*Bot. Gaz.*, xlvi., September 1908, pp. 161-178).—There are two primary prothallial cells, which may form as many as eight prothallial cells; also both stalk and body cells, and 12 to 24 chromosomes.—*G. F. S.-E.*

Polypodium Pteropus, Bl. By A. Ernst (*Ann. Jard. Bot. Buit.*, vol. vii., pp. 103-143; 3 plates).—The influence of environment on the structure and growth of *Polypodium Pteropus* (which was found growing submerged at the bottom of a temple tank at Lanbok, in the garden of the former Sultan of Lingsar), is described.—*S. E. W.*

Potash, Experiments with Feldspathic Rock as a Source of. By B. L. Hartwell and F. R. Pember (*U.S.A. Exp. Stn. Rhode I., Bull.* 129; June 1908).—The results of water culture experiments with wheat seedlings in which ground feldspathic rock (of a fineness that it would pass a sieve with 200 meshes to the linear inch) took the place of potassium chloride in some of the bottles. Other experiments were performed in pots. In neither case did the finely ground rock appear to provide an amount of potash sufficient to justify the investigators in recommending its use as fertilizer even upon an experimental scale.—*F. J. C.*

Potato, Brown Spots in Tuber. By W. J. Morse (*U.S.A. Exp. Stn. Maine, Rept.* 1907, pp. 318-319; figs.).—Brown spots in the flesh of the potato are described. They were not apparently due to the presence of any fungi or bacteria. Some varieties appear to be more susceptible than others and the disease is looked upon as constitutional.—*F. J. C.*

Potato Diseases in San Joaquin County, California. By W. A. Orton (*U.S.A. Dep. Agr. Circ.* 23; January, 1909).—The principal cause of the marked decrease in the yield of old potato land is the presence of a fungus disease, the wilt or dry rot (*Fusarium oxysporum*, Schlr.). The leaves assume a dull unhealthy appearance, with a rolling or curling of the margins. Gradually the tops wither or fall over; the diseased plants are easily pulled up, the roots partly dead and brittle. The fungus appears on them as a white or pink mould. When the underground portion of the stem is cut across, a pronounced brown discoloration is visible. The brown stain is also found in the branches leading to the tubers. When the potatos are dug there is rarely any external evidence of disease. When infected potatos are stored in a warm temperature, dry rot soon appears.—*M. C. C.*

Potato Experiments. (*Jour. Dep. Agr. Vict.* Sep. 1908, pp. 559-575).—Immature potato seed in the case of 'Beauty of Hebron' gave better results than were obtained from seed perfectly ripe and well matured. Change of seed from one district of the State to another did not, however, appear to affect the productiveness.—*C. H. H.*

Potato, Improvement of the. By Edward M. East (*U.S.A. Exp. Stn., Illinois, Bull.* 127, pp. 375–456).—The author considers that promising strains may perhaps be isolated from *S. Commersonii*, but not from any of the other wild species of potato. Even Commerson's potato has so far not proved satisfactory in the United States. After a short discussion of the historical facts dealing with the introduction of the potato into Europe he points out that certain varieties do not produce flowers or else have infertile pollen which makes the introduction of new strains by crossing or raising from true seeds a difficult and uncertain process. Ninety per cent. of the modern United States crop is from varieties which have been produced by scientific breeders such as the late E. S. Carman. The differences in yield of these varieties is very great, varying from 18·7 ('E. Six Weeks') to 137·7 bushels ('Green Mountain') of marketable tubers per acre. The yield is in proportion to the growing season, provided that there is entire maturity before frost. In general, luxuriant vegetation is a sign of great productiveness, but in some varieties excessive vegetative growth is opposed to tuber formation. Rapid growth at first increases the yield, which is affected also by the weight of the seed-piece, by the amount of sunlight (darkened glass, clear glass, and open air as 1 : 5 : 11), by differences of age and of vigour in eyes when sprouted before planting, and by depth of planting. Drying the seed tubers, up to a loss of 20 per cent. moisture, also increases the yield.

The author summarizes a large number of experiments dealing with the inheritance of characters when tubers are specially selected. Many of these experiments did not result in definite conclusions, for seasonal, climatic, and local soil conditions have "a tremendous effect."

It is, however, quite clear that tubers of a plant which has a large yield tend to be extremely productive. Thus in one variety large seed tubers of a productive mother plant gave a crop of 319 g. Small seed tubers of the same plant gave 220 g., whilst large and small seed tubers of a small-yielding mother plant gave 113·3 g. and 80·9 g. respectively.

The author also discusses the question of degeneration in potato varieties, and considers that there is no "old age" degeneracy, but that disease control is the most important point to consider.

The quality of potatos for table use depends upon the anatomical structure. A thick cortical layer and small number of eyes are of advantage. Variations in table quality may be inherited, and can be used for the formation of new varieties. There are also variations in quality within one strain which are produced by the particular conditions under which the potatos have been grown.

In composition (total nitrogenous matter) there is a surprising variability within one particular variety. Smaller, younger tubers are richer in nitrogen; but particular shapes or the number of eyes do not give any information as to the nitrogen content. Specific gravity tables are unsafe for the determination of the amount of starch. One tuber with specific gravity 1·090 contained 14·32 per cent. nitrogenous matter. Another (1·091 specific gravity) had only 7·59 per cent.

There are also experimental results with regard to high protein selection, amount of potassium chloride to the acre, and a useful bibliography of 114 numbers.—*G. F. S.-E.*

Potato Leak (Potato Diseases). By W. A. Orton (*U.S.A. Dep. Agr. Circ.* 23; January, 1909).—Considerable loss is occasionally experienced from the rapid decay of potatos shortly after harvesting. This trouble is locally known by the term "leak" or "melters." The decay is due to the invasion of a fungus (*Rhizopus nigricans*). The fungus can enter only through wounds, and potatos injured by careless digging especially are attacked. The fungus is propagated by spores produced in large heads, or sporangia. It can grow on a variety of dead organic substances. It is known to cause decay in sweet potatos, apples, and pears. As a remedial measure avoid breaking the skin of the potato in handling; avoid piling newly dug potatos in large piles where they will "sweat." Keep the potatos dry and well ventilated.
M. C. C.

Potato Plant Louse. (*Nectarophora solanifolii*). By E. M. Patch (*U.S.A. Exp. Stn. Maine, Rept.* 1907, pp. 235–257; figs.).—This aphis is reported to have done great damage to potatos during recent years. The insect attacks the upper parts of the plants and causes the shrivelling of leaves, etc. A general account of the life cycle of aphides is given and details concerning field and insectary observations. The winter host of the species is at present unknown, but in captivity the insects fed on both shepherd's purse and peas. It is regarded as impracticable to spray large areas of potatos with paraffin emulsion or, so far, to attack the pest through its winter host, but it is thought that clean cultivation including autumn ploughing and burning old potato haulm may have a beneficial effect. Various predaceous insects were found feeding upon it and parasitic insects and fungi which destroyed the insects wholesale were discovered. Technical descriptions of the various stages of the insect are given.—*F. J. C.*

Potato Scab. By W. J. Morse (*U.S.A. Exp. Stn. Maine, Rept.* 1907, pp. 304–317; figs.).—The following table shows the results obtained by disinfecting tubers:

—	Lb smooth	Lb. scabby	Total from plot	Per cent. scabby
Formalin solution:				
Seed scabby	776	5	781	0·6
,, smooth	820·5	6·5	827	0·8
Formalin gas:				
Seed scabby	822·5	9.5	832	1·1
,, smooth	834	3·7	837·7	0·4
*Sodium benzoate:				
Seed scabby	849·5	10·6	860·1	1·2
,, smooth	855·5	15	870·5	1·7
Untreated:				
Seed scabby	792	55·1	847·1	6·5
,, smooth	819	36·7	855·7	4·3

* Soaked two hours in 15 gallons of water containing 20 ozs. of sodium benzoate. The treatment in the other cases is detailed in the following abstract.

Thus exposure of the seed to formaldehyde gas is as effective as steeping in formalin solution. A figure and description of the fumigating room is given. The quantity of formaldehyde gas recommended was found not to injure the eyes of the potato in any way except when the tubers were placed very near the generating pan or immediately above it. Lime was shown to increase the amount of scab materially thus:

Treatment	1000 lb. lime	500 lb. lime	No lime
Per cent. of scab on potato crop	49	27	11

F. J. C.

Potato-Scab, Prevention of. By W. J. Morse (*U.S.A. Exp. Stn. Maine, Bull.* 141; 1907). Potato scab due to the fungus *Oospora scabies* is reported to be spreading. The scab fungus thrives best in an alkaline soil, and is favoured by the application of stable manure, wood ashes, air slaked or caustic lime, potash, lime and magnesia. It is more prevalent in heavy, moist soils than in light, dry ones. When the soil is once infected the danger of the disease attacking potatos placed in it remains for many years. It is recommended to green manure such land as a partial check upon the disease before attempting to grow potatos upon it. When fresh soil is brought into cultivation care should be taken to plant only tubers free from scab, and these should be disinfected. The potatos may be soaked for 2 hours in a solution of ½ pint of formalin in 15 gallons of water, or in a solution made by dissolving 2 oz. of corrosive sublimate in 15 gallons of water for 1½ hour. The seed tubers may also be disinfected by exposing them to formaldehyde gas in a close room for from 24 to 48 hours. The gas is generated by placing potassium permanganate in wide, flat-bottomed tin or galvanized basins 8 inches in height, and pouring over it formalin, closing the room at once. Twenty-three ounces of potassium permanganate and 3 pints of formalin are required to generate sufficient gas to fill 1000 cubic feet.—*F. J. C.*

Potato Scab, Varieties of. (*Jour. Bd. Agr.* xv. 10, January 1909; pp. 749–751; 2 plates).—Scab in potato may be due to (1) mechanical injury, due to the presence of ashes or sharp sand in the soil, or to a season of drought; (2) black scab due to the attacks of a fungus; (3) the attack of millipedes, especially *Julus pulchellus*; (4) the attack of the fungus *Oospora scabies*, which produces a scab superficially resembling that due to mechanical injury, but distinguished by the presence of the parasite; (5) the attack of the fungus *Spongospora scabies*.—*F. J. C.*

Potato Spraying. By W. J. Morse (*U.S.A. Exp. Stn. Maine, Rept.* 1907, pp. 287–304).—Relative results of spraying with standard Bordeaux mixture against the leaf diseases caused by *Phytophthora infestans* and *Alternaria solani*, as compared with dust sprays and spraying with Bordeaux substitute are reported, the results being greatly in favour of the Bordeaux mixture. Heavy and frequent spraying is shown to be more beneficial than frequent light spraying with Bordeaux, owing probably to the better covering of the foliage by the former method. Spraying is often ineffectual in Maine because the spray is imperfectly distributed, the commencement of spraying is delayed too long, the mixtures are improperly made, the quantities to be used being guessed at, and the materials are mixed in the wrong way.—*F. J. C.*

Potato: Surface Spotting of Tuber. By W. J. Morse (*U.S.A. Exp. Stn. Maine, Rept.* 1907, pp. 321–322).—Black spots on the surface of the tuber from the size of a small pea to half-inch in diameter, on which, when isolated, the fungus *Phytophthora infestans* developed. It is recommended that such tubers be not planted.—*F. J. C.*

Prairie Grass of Dakota, Floral Succession in the. By Le Roy Harris Harvey (*Bot. Gaz.*, August 1908, pp. 81–109: with 3 figures).—The author describes three distinct stages, early spring, spring, and early summer (second week in June to end of July) in the flora of South-Eastern South Dakota.

The climatic features of each of these successive flowering periods are given very fully, and the differences due to the various exposures and to the positions of the plants (as at the base or toward the crest of the ridges) are carefully distinguished.

This area seems to show the steady colonization of part of the prairie by the forest flora of the south-eastern district, to which region, in the author's opinion, it had been driven back during the glacial period. He considers that the "*Poa pratensis* sod" is followed and occupied first by the Wolfberry shrub (*Symphoricarpus occidentalis*). This is the forerunner of *Rhus glabra*. These two shrubs are then dispossessed by *Quercus macrocarpa* and *Ulmus fulva* associations as the forest pushes out on the prairie.

To the west and south-west of the region the plain or prairie type predominates and is of a more xerophytic character, becoming more and more arid and desert-like towards the west.

The author does not think that the absence of trees on the natural prairie is due so much to forest fires, but rather to the lack of soil moisture, and to the dense sod, which make it difficult for the seeds of trees to germinate. Seedlings will also hardly resist the severity of their first winter. This paper is a very interesting one, although a few unusual technical terms are at first disheartening to non-botanical readers.

G. F. S.-E.

Preservative Treatment of Loblolly Pine Cross-arms. By W. F. Sherfesee (*U.S. Dept. Agr. Forest Service, Circ.* 151).—An account of the seasoning and grading of the timber of the Loblolly Pine, which has been found so useful for the making of cross-arms. The length of time required for air-seasoning depends largely on the character of the timber, atmospheric conditions, and the manner in which it is piled, all of which are fully described in this pamphlet. Several useful tables and illustrations of the best methods of piling cross-arms are also given.

A. D. W.

Protoplasmic Streaming and Plasmolysis (*Bot. Gaz.* July 1908, pp. 50–56).—Miss Grace M. Bushee and W. Y. V. Osterhout have short papers on these subjects in this magazine. The former measured the rate of streaming in millimetres a minute in thirty-six common greenhouse plants. She recommends especially *Gloxinia speciosa* (cell of hair from stem, leaf blade or petiole), *Abutilon striatum* (hair from ovary surface), *Lycopersicum esculentum*, *Whitlavia grandiflora* (hairs), *Lobelia Erinus* and *Saxifraga cotyledon* (hair from leaf-edge). The second paper deals with exceptional cases of plasmolysis in which the protoplasm is not impermeable to the substances in solution.—*G. F. S.-E.*

Prunus serotina (Ehrhart), **Prunus virginiana** (Miller). By F. B. Power and C. W. Moore (*Jour. Chem. Soc.* vol. xcv., March 1909, pp. 243–261).—An investigation into the constituents of 'wild cherry bark,' of which hitherto little has been known, notwithstanding its use for medicinal purposes. The specimen examined yielded hydrocyanic acid, benzoic acid, an aromatic essential oil present in too small quantity for immediate investigation, oleic, linolic, palmitic, and stearic acids, ipuranol (a solid dihydric alcohol also found in *Ipomoea purpurea*, nutmeg, and olive bark), methylaesculetin (a glucosidal compound allied to one found in the horse chestnut and in seeds of *Euphorbia Lathyris*) protocatechuic acid, *p*-coumaric acid, and trimethygallic acid (a substance not hitherto found in nature).—*W. A. V.*

Pseuderanthemum seticalyx (*Bot. Mag.* tab. 8244).—Nat. ord. *Acanthaceae*; tribe *Justicieae*; Tropical Africa. Under-shrub, erect; leaves ovate; inflorescence spiked; corolla salver-shaped, limb cinnabar-red, 1 inch diameter.—*G. H.*

Psylla (Apple Sucker). By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Tenth Report*, 1909, pp. 26–34).—The best results in controlling this pest were obtained by spraying with a nicotine solution between the time of the swelling of the fruit buds and the fall of the blossoms, a mortality of 90 to 99 per cent. resulting when the strength of the solution was not below ·075 per cent. (*e.g.* one pound of Voss's solution in 10 gallons of water). Growers should ascertain the strength of the solution they buy.—*A. P.*

Rehmannia angulata. By Max Ghierbrandt (*Le Jardin*, vol. xxii. No. 513, p. 204; July 5, 1908; 2 figs.).—The author finds this to be a much hardier plant than is generally supposed. It resists frost in an unheated greenhouse better than Pelargoniums, and may be planted out by the end of April. A month later it will be in full flower, and continues to bloom throughout the summer and autumn. Moreover, it will bear taking up and potting for exhibition at any moment, with subsequent replanting. The flower lends itself as readily as Salpiglossis or Mimulus to the production of new variations in colour. Already such varieties of the common *R. angulata* as *tigrina* and *rosea* are in the market.—*F. A. W.*

Respiration, Rise of Temperature in. By George T. Pierce (*Bot. Gaz.*, September 1908, pp. 193–202).—The author has found a new and efficient method of exhibiting the increased temperature in respiration and fermentation.

This consists essentially in the employment of Dewar's flasks or double-walled glass vessels with a vacuum between the two walls. (The ordinary "Thermos" flasks depend upon the same principle.) He was able to obtain with silvered flasks temperatures of 54°, 55° and 56° with living germinating peas, whilst the dead peas in control flasks only showed temperatures of 14° and 15°.

The rise of temperature in the case of fermenting yeast was clearly shown, and also the increase in temperature or "fevered state" of chopped onions when compared with uninjured specimens.

The efficiency of the individual Dewar's flasks appears, however, to show considerable variation.—*G. F. S.-E.*

Ribes speciosum. By J. Mottet (*Le Jardin*, vol. xxii. No. 518, p. 271 ; September 20, 1908 ; 1 fig.).—*Ribes speciosum* or *fuchsioides*, a native of California and British Columbia, was introduced in 1829. The small pendant flowers are characterized by very long stamens of a brilliant scarlet. The bush resembles *Fuchsia Riccartoni* closely, but its long sharp thorns distinguish it. It grows about 3 feet high, and flowers in May and June. Fruit a small red berry. In the autumn the foliage turns a rich crimson. Unfortunately, it is not hardy, and needs protection in winter. But in the south it grows to a great height, and is a striking ornament to the shrubbery.—*F. A. W.*

Root, Geotropy of. (*Beih. Bot. Centralbl.*, xxiv., Erste Abth., Heft 1, pp. 96–110 ; with 1 plate and 6 figures).—Mr. Frederick C. Newcombe shows that the sensitiveness of the root to gravity is not confined to the last 2 mm. of the root tip, but may extend 4 mm. back from it, and possibly through the elongating zone.

There is apparently no relation between the extent of the sensitive zone and length of the elongating zone.—*G. F. S.-E.*

Roots of Fagara xantholoxoides. By H. Pries (*Not. König. Bot., Berlin*, No. 44, pp. 99–101).—The rind of these roots contains fagerol ($C_{14}H_{14}O_4$), and two alkaloids, which resemble myosin and veratin in physiological action.—*S. E. W.*

Rubber Tree in Hawaii, The Ceara. By Jared G. Smith and Q. Q. Bradford (*Hawaii Agr. Exp. St. Bull.* 16 ; 30 pp.).—Gives a very full account of the cultivation and tapping of this valuable rubber-producing plant. Rubber is now so valuable and much in request that enough of the raw material to satisfy the yearly demands is not forthcoming. There is now apparently a race among countries having lands available for rubber production to see which can get the largest acreage of rubber trees into bearing in the shortest time, in order to harvest the marvellous profits which seem almost absolutely certain.—*A. D. W.*

Rubus koehneanus (*Bot. Mag.* tab. 8246).—Nat. ord. *Rosaceae* ; tribe *Rubeae* ; Japan. Shrub 3–4 feet high ; leaves 3–5 lobed, green above, white pubescent below ; flowers few, petals white ; drupes few, orange.—*G. H.*

Salts in the Soil, Absorption of. By J. Rosen and C. Heller (*Bot. Gaz.*, September 1908, pp. 224–229).—The authors found that wheat seedlings when only watered with potash and other salts endured far greater concentrations of the salt than similar plants which were immersed in soil extracts.

Even so low a concentration as 700 parts in a million (of P_2O_5) proved injurious to those immersed, but when watered with a solution of 2,000 parts in a million the plants remained alive for three weeks. These results were found with plants growing in sterile quartz sand; but in ordinary soil, and especially in manured soil, still higher concentrations were tolerated.

The absorption of phosphates in the soil varied (according to the system used for detection) from 20·5 to 27·2 parts in a million in a solution of 1,000 parts in a million, or in manured soil from 25·5 to 30·2 parts in a million. With a solution of 2,000 the absorption varied from 26 to 32·6 parts in a million. The absorption is a negligible quantity in the case of nitrate salts.—*G. F. S.-E.*

Saxifraga scardica (*Bot. Mag.* tab. 8243).—Nat. ord. *Saxifragaceae*; tribe *Saxifrageae*; Balkan Peninsula. Herb, densely tufted; leaves $\frac{1}{4}$–$\frac{2}{3}$ inch long; stems 3–4½ inches long; bearing clusters of white flowers.

G. H.

Schizophragma hydrangeoides and **Hydrangea petiolaris.** By R. Rimbault (*Le Jardin*, vol. xxii. No. 519, p. 292; October 5, 1908; 2 figs.).—Two hardy climbers recommended for walls or trellis. The former is a native of Japan and throws out aërial roots which cling like Ivy. The deciduous leaves develop in April, and are opposite and cordiform, bright green above and white below. Flowers small and creamy-white, in dense corymbs. Large oval folioles of the purest white are superposed on the inflorescence, developing above the flowers, and form the chief attraction of the plant. Flowers May–June. Best propagated by cuttings. *Hydrangea petiolaris* differs in having no folioles, but a few flowers with large white sepals project from the inflorescence, *Hydrangea*-fashion.

F. A. W.

Scillas. (*Garden*, January 1909, p. 17.)—The writer, continuing a previous article, finds a depth of eight inches the deepest at which the common bluebell can be planted with success. The spikes are finer, and the yield of flowers and seeds greater when the bulbs are barely covered with soil. He enumerates seven varieties of Scilla, and gives cultural directions for each.—*H. R. D.*

Senecio latifolius, Alkaloids of. By H. E. Watt, D.Sc. (*Jour. Chem. Soc.* vol. xcv., March 1908, pp. 466–477).—A research undertaken at the request of the Cape Government, who are investigating the alleged poisoning of cattle by this plant.

Two hitherto unknown alkaloids were isolated, for which the authors propose the names Senecifoline and Senecifolidine respectively. The former of these has been found to be poisonous to animals, but further investigation is in progress.

The injurious effects of other species of *Senecio* are already known.

W. A. V.

Shade, Effect of in Preventing Fruiting. By L. Chasset (*Le Pomologie Française*, March 1908, p. 84).—A 'Beurré Superfin Pear,' shaded by a small house, has taken seventeen years before bearing any fruit; a 'Joséphine de Malines' planted in the shade of a large tulip tree has never borne fruit. Two trees of the same varieties planted in the sun, pruned by the same gardener, regularly produce each year small crops of very good pears. The shade of the house and the tree has in this case evidently been the cause of sterility.

Composition of the soil also affects fertility; some soils lack phosphate of lime or potash and the trees bear after the necessary constituents have been supplied.—*C. H. H.*

Shade Trees. The more important Insects affecting Ohio. By J. S. Houser (*Agr. Exp. Sta. Ohio, Bull.* 194).—Contains information regarding the injurious woodland insects of Ohio, but particularly such as affect shade trees. The beautifully executed illustrations, some sixty in number, make the work still more valuable, for little difficulty will be found in recognizing a particular species from the pictures. What strikes one most in reading the book is the almost entire absence from the Ohio woods of the insect pests which trouble us so in this country. There are useful notes regarding spraying, preparing the various insecticides, and a table showing the common trees of New York State with relation to their liability to insect attack. The Ohio conditions do not vary to any great extent from those of New York.—*A. D. W.*

Shrubs, A Wild Garden of. By W. Dallimore (*Garden*, January 1909, p. 37).—The writer tackles the problem of covering dry banks of poor soil. He states that it has been satisfactorily solved at Kew by using for the purpose, double, single, and dwarf Gorse, Lavender, Rosemary, *Cistus laurifolius, C. ladaniferus, C. monspeliensis*, Savin, Brambles, *Potentilla fruticosa, Berberis aquifolia*, and *B. stenophylla*.—*H. R. D.*

Shrubs and Hardy Trees suitable for Forcing. By A. Osborn (*Gard. Chron.*, No. 1,146, p. 408, December 12, 19, and 26, 1908).—The author gives a list of the plants most suitable for forcing, and the best methods of cultivating them.—*G. S. S.*

Shrubs for Winter Effect, Best Evergreen. By Miss H. B. Cannon (*Garden*, January 1909, p. 17).—The writer mentions thirty-nine species, and gives directions for planting, pruning, and propagation.
H. R. D.

Shrubs in Spring Bedding. By A. W. (*Garden*, January 1909, p. 15).—The writer mentions shrubs suitable for the purpose, particularly referring to Forsythia, Ribes, Cydonia, and Daphne, and giving directions for their treatment when used in this manner.—*H. R. D.*

Shrubs, The Unseasonable Flowering of. By S. W. Fitzherbert (*Garden*, January 1909, p. 27).—The writer mentions the following in flower at the close of 1908: *Choisya ternata, Cytisus racemosus, Pittosporum Tobira, Laburnum, Crataegus pyracantha, Olearia stellata*

Calceolaria Burbidgei, Leptospermum scoparium, Correa cardinalis, Grevillea rosmarinifolia, and *Convolvulus cneorum.*—*H. R. D.*

Sisyrhinchium, Anatomical Studies of North American Species of. By Theo. Holm (*Bot. Gaz.*, September 1908, pp. 179–192; 2 plates).—The author finds from the anatomical characters that the genus is a very natural one and ought not to be subdivided.

"In regard to the almost untold number of recently described 'species' of *Sisyrhinchium*, I have examined the internal structure of some of these, but so far have failed to detect any character that might appear specific; and, moreover, it seems very evident, when the diagnoses of the majority of these are read, that they deal not with 'species' but merely with 'local forms.'"—*G. F. S.-E.*

Snowdrops and how to grow them. By W. Irving (*Garden*, January 1909, p. 1).—The writer recommends growing them in the grass, under the shade of trees, on the margins of woodland walks, or in thin deciduous shrubberies. After mentioning the autumn-flowering species, *Galanthus nivalis* var. *octobrensis* (October), *G. Olgae* (November), and *G. cilicius* (December), which he notices fail to increase readily, Mr. Irving enumerates fourteen varieties, giving cultural details, laying stress on the importance of a light, well-drained soil, which will allow the bulbs to become somewhat dry in summer. He also gives instructions for cultivation in pots.—*H. R. D.*

Sorbus Vilmorini (*Bot. Mag.*, tab. 8241).—Nat. ord. *Rosaceae*; tribe *Pomeae*; China. Shrub or small tree 10–20 feet high; leaves slender, unequally pinnate, with 9–14 pairs of leaflets; flowers small, white; fruit globose, red.—*G. H.*

South Texan Prairie, Change of Vegetation on the. By O. F. Cook (*U.S. Dept. Agr., Bur. Plant Industry*, Circ. No. 14).—According to Mr. O. F. Cook, forest and swamp once occupied the gulf plains of Texas. Then followed a period of primitive Indian agriculture, in which forest stretches were cleared by fire. Such clearings remained under grass on account of the regular fires, which prevented the development of trees. So the land became open grassy prairies, where nomad hunters chased the great herds of buffaloes. In the early days of cattle ranching the fires were "very besoms of destruction" but as the grazing became more thorough, the fires became of less importance and were kept under control. Sometimes it was found impossible to set fire to the old grass, especially in dry seasons.

Then a new development began, for pioneer bushes of the *Prosopis* established themselves and formed "open mesquite country"; upon these followed the invasion of *Acacia Farnesiana*, giant cacti, or "oak runners," and the forest was by means of these forerunners gradually reoccupying the land.

But this will not happen, for the ranch-owners are selling their land to "truck" farmers who find the land fertile and productive even though five to ten dollars an acre has to be paid for clearing away the bushes.

Unfortunate speculations, "booms," and individual losses will doubtless occur. Irrigation and tillage are, however, transforming not only the appearance of the country but the character of the soil itself.—*G. F. S.-E.*

Spenser, The Flowers of. By H. N. Ellacombe (*Gard. Chron.*, No. 1,121, p. 393, June 30, 1908, and subsequent Nos.).—In this paper Canon Ellacombe gives an alphabetical list with interesting comments upon the flowers mentioned by the poet Spenser. The writer says: "The account of the flowers does not profess to be a positive or scientific account, and the papers are rather an annotated index, or perhaps a concordance. I have quoted, but as shortly as possible, his allusion to each plant, and added short notes on those of them which seemed to require it."—*G. S. S.*

Spraying Mixture. By Dr. Contant (*Jour. Soc. Nat. Hort. Fr.*, p. 122; February 1909).—The author describes the process of manufacture of a spray fluid which he has found very effective, with the warning that, as it produces poisonous fumes during its preparation, it must be made out of doors. Once it is on the trees, however, a short exposure to the action of the air makes it quite innocuous to all but insect pests. A cauldron capable of holding 36 litres is raised on three bricks, 2 litres of water are put in it, and a fire is lighted underneath. When the water boils, 1½ kilos. of quick-lime are put into the cauldron to slake. Water is then added little by little until the kettle is half full, and next 1½ kilos. of flowers of sulphur are sifted in through a sieve, the mixture being stirred all the while to prevent its getting lumpy. When the sulphur is well mixed the whole is left to boil for about half an hour, and finally enough water is added to fill the cauldron.

If there are many tree to dress, the mixture may be well stirred up and applied with a brush to trunk and branches during the winter, not later than the end of January, as it would burn the buds later.

The mixture may also be left standing for six hours, when a yellow deposit, having a slight excess of lime, will have settled at the bottom, leaving a clear orange-coloured liquid above. This may be drawn off with a syringe into some vessel which may be corked up, as it spoils if exposed to the air.

What Dr. Contant calls the "pure mixture" or the deposit should be applied in the same way as already described, first scraping the lumps made by scale, to allow the poison to have its full effect. The clear liquor, on the other hand, may be used for spraying during spring and summer. When the leaves are young one part of liquor to ten parts of water is strong enough, later one in six parts may be used. For peaches, vines, roses, and beans, however, the weaker solution is always safer.

For slugs among strawberries or salads, make holes from 15 to 20 centimetres deep among the plants, pour in a glassful of the mixture, and fill in the hole.—*M. L. H.*

Statice arborescens. By H. Correvon (*Le Jardin*, vol. xxii. No. 514, p. 212; July 20, 1908; 2 figs.).—This curious type is indigenous to the Canaries, as already described by M. Correvon in *La Nature*, April 7, 1906. The *Gardeners' Chronicle*, December 17, 1904, also has a note by D. Perez, describing the few specimens extant—all the rest having died out or been devoured by wild goats. These plants rarely produce seeds, owing probably to senility of species, but a few have been collected and raised at Lyons, whence comes this new and charming sub-arborescent species. Height 3–4 feet, with graceful panicles of blue flowers—almost perpetually in bloom. The best species are *S. arborescens* Brouss, and *S. fruticans* Webb. *S. brassicaefolia* Webb, *imbricata* Webb, *macrophylla* Brouss, *macroptera* Webb, and *pulverula* Webb are of a dwarfer habit, with large sprays of flowers; but all are highly ornamental. M. J. Brun, of Montplaisir, Lyons, is the principal cultivator.—*F. A. W.*

Stock on Scion, Influence of. By G. Rivière and G. Bailhache (*Jour. Soc. Nat. Hort. Fr.*, p. 133, February 1908).—Another note on the marked influence of the stock on the scion, taken this time from investigations made on vines.—*M. L. H.*

Stocks, Deep Planting of Paradise. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Ninth Report*, 1908, pp. 57–64). Stocks planted 24 inches deep weighed three times as much at the end of two years as similar stocks planted only 6 inches deep, new root systems in the former case having been formed from the stems at the optimum depth below the surface. Further investigations are being conducted. With crab stocks deep planting gave bad results, as indeed it would do with all worked trees.—*A. P.*

Stocks, Fruit Tree. By C. T. Cole (*Jour. Dep. Agr. Vict.* August 1908).—*Apples*, in order to resist attack by woolly aphis (*Schizoneura lanigera*) are being grafted on ‘Northern Spy’ and ‘Winter Majetin,’ both stocks being immune to this pest; the ‘Northern Spy’ is the better stock. There are other blight-proof kinds of apples which could doubtless be used as stocks, but there is no need to increase the number except for special purposes. To prevent the stock from becoming weaker in its constitution from constantly working and re-working on the same variety, Mr. Cole has worked ‘Majetin’ on ‘Spy’ and ‘Maggs Seedling’ (another blight-proof kind, and robust in constitution) upon the ‘Spy,’ with the best results. For dwarf-apple culture the ‘Spy’ can be used, and the ‘French Paradise’ worked upon the ‘Spy,’ and the desired kind again worked upon the ‘French Paradise.’ There is now in this State, raised from seed there, a ‘Paradise’ apple tree of dwarfing habit, free surface rooting properties, very easily propagated, and upon which the desired kinds may be worked direct. All kinds appear to thrive admirably upon it and it is quite blight-proof. Planters need to take care that their trees are worked sufficiently above the surface of the ground to prevent the scion from striking roots into the ground, and displacing the blight-proof stock, thus rendering the whole tree roots liable to become a blighted mass.

Apricot.—The ‘Mussel’ plum stock is found best; ‘La France,’ a variety of the Myrobalan, is largely used, as it is easily propagated from cuttings and does not sucker.

Peach.—Stock raised from peach stones is generally the best; selecting stones from medium sized mid-season varieties. In some districts almond makes the best stock.

Plum.—The 'Mussel' plum stock is generally best; other varieties used include the 'Julien,' the seedling plum stock, also 'La France' a variety of the Myrobalan cherry plum, upon which Diamond and Orleans plums succeed well.

Cherry.—The 'Mazard' and 'Mahaleb' stocks used in Europe do not suit Victoria. There, a small red cherry of the 'Montmorency' section, much like a 'Kentish,' is found to be the best suited: it is a good cooking variety, and pleasant to eat; it acts as a dwarfing stock.

Pear.—The stock most generally adapted for the pear is the seedling pear stock, raised from the hardiest known kinds. Pear suckers are a bad stock.

A small variety of quince, 'Angers,' is successful. As there are but very few kinds of pears that do well when worked directly upon this quince, it is usually necessary to double work, using first such kinds as 'Beurré d'Amanlis,' 'Louise Bonne of Jersey' or 'Beurré Diel' upon the quince; allowing them to make one growth, and then working upon these the desired sort, when perfect health and vigour will be attained.

C. H. H.

Stokesia cyanea praecox. By G. T. Grignan (*Rev. Hort.*, February 16, 1909, pp. 83–85; coloured plate and illustration).—A very pretty large Aster-like flower, 3½ inches across, lilac-tinted, with conspicuous white stamens, hardy, somewhat dwarfer than type, does best with southern exposure.—*C. T. D.*

Stomata. By Sophia H. Eckerson (*Bot. Gaz.*, xlvi., September 1908, pp. 221–224).—According to the author the stomata of well-watered greenhouse plants are widely open about 10 A.M., and in favourable weather remain so until about 2.30 P.M., when they begin to close. They are fully closed by 5 P.M. or 6 P.M. On hot days in the spring they may shut even at 12 noon because of incipient wilting of the leaf.

The author recommends Chrysanthemum, *Tradescantia*, and *Pelargonium zonale* as the best common greenhouse plants for observing the stomata. A list is given of the number of stomata to the square millimetre and of length and breadth in microns in the cases of thirty-seven greenhouse plants.—*G. F. S.-E.*

Strawberry and Raspberry distributed for trial from Experiment Station. By V. P. Hedrich and O. M. Taylor (*U.S.A. Exp. Stn. New York, Bull.* 298).—As the result of ten years' work in breeding new varieties, three new kinds of strawberry and four varieties of raspberry are recommended for trial. The conditions are that the plants, six of raspberry, twelve of strawberry, of each variety, are given free, carriage being paid by the grower, he to keep the varieties true to name, give them good care, and report on the behaviour of the varieties from time to time until the value of a variety for a locality is determined. The parentage and careful description of each variety is given, with photographs of the fruits.—*C. H. H.*

Strawberry Test Plot and Strawberries. The Newer Varieties. By F. H. Ballow (*U.S.A. Exp. Stn. Ohio, Bulls.* 178 and 186, 1906 and 1907).—The bulletins contain careful descriptions and photographs of new varieties, together with a record of flowers (perfect or imperfect), date of first blossom, first ripe fruit, period of heaviest fruiting, largest single picking in quarts, last picking, total yield in quarts for season, of some 120 sorts of strawberry.—*C. H. H.*

Strawberries, Three New. By M. Houssy (*Le Jardin*, vol. xxii. No. 520, p. 317 : October 5, 1908 ; 1 fig.).

1. *Gemma*, out of 'Louis Gauthier' × 'Saint Joseph.' Remarkably vigorous, and constant fruiter. Large berries, white, shading pink—oval in shape.

2. *Mirabilis.*—Same origin as Gemma, but distinct variety. Equally vigorous, but of more compact habit. Very precocious, free bearer. Admirable for forcing. Berries are finer than Gemma, pale pink shading red. Perhaps more abundant in the first year, but Gemma fruits better in its second season.

3. *Suavis*, from 'Sharpless' × 'Saint Joseph.' Distinguished for size and flavour rather than for quantity of berries. Deep red. Rather susceptible to drought.—*F. A. W.*

Sumac, Commercial Sicilian. By F. P. Veitch (*U.S. Dept. Agr. Bur. Chem. Bull.* 117).—As a vegetable tanning material Sicilian Sumac has perhaps no equal for pale colours and soft tannage, and consequently is extensively used for moroccos, roans, skivers, &c., and for brightening the colour of leather tanned with dark materials.

The Sicilian Sumac (*Rhus corioria*) is a small shrubby bush, native of Sicily and Tuscany, and succeeding best on soil of a calcareous nature. The leaves from which the tannin matter is extracted are collected about the beginning of July and left lying on the field till partially cured, care being taken that they are not unduly exposed to rain or intense sunshine. There is much valuable information given as to the means by which adulteration of the Sumac is detected, and lengthy tables as to the chemical and microscopical examination of the samples that were furnished.—*A. D. W.*

Thermotropism of Flaxplant. (*Beih. Bot. Centralbl.*, xxiv., Erste Abth., Heft 1, pp. 111–131 ; with 6 figures).—The flax is very sensitive to heat, and shows very interesting curves and bendings which are fully investigated by Herr Josef Pohl in this paper.—*G. F. S.-E.*

Timber Trees in the Cameroons. By A. Engler (*Not. König. Bot. Berlin*, Appendix xxi., No. 1, pp. 1–8 ; 4 plates).—The following trees (order Olacaceae) are prized by the natives on account of the hardness of their wood :—*Ongkea Camerunensis*, *Strombosia grandiflora*, *S. Schefflcri*, *S. glaucescens*, *Strombiopsis tetrandra* and *Coula edulis*. The seeds of the last are eaten raw or roasted.—*S. E. W.*

Tree Planting (*The Quarterly Journal of Forestry*, January 1909). —"Recent Progress in Afforestation" contains much that is practical and to the point, while "Tree planting in Towns," though not going fully into the matter, is valuable as partially elucidating a question that to Londoners at least is of more than passing interest.

Another excellent paper is that on effects of overthinning and ground moisture upon the growth and value of plantations, in which the prevailing tendency to leave the standards too far apart on the ground is clearly put forward.—*A. D. W.*

Tree and Wood-infesting insects, Some. By H. Garman (*U.S.A. Exp. Stn. Kentucky, Bull.* 120 ; May 1905 ; 3 plates and figs.).—An account of the principal insect pests of trees and wood in Kentucky. The elm leaf-beetle (*Galerucella luteola*) is a serious pest of the English elm. Banding to catch the mature insect is absolutely useless, but a band placed round the trunk when the larvae are about to descend the tree to pupate in the earth will entice many to form pupae behind it, where they may then be captured and destroyed. Spraying with arsenate of lead has proved very effective. 13096 beetles (larvae, pupae and imagos) were obtained from one tree. Other insects dealt with are a leaf-miner (*Lithocolletis hamadryadella*) causing considerable damage to the bur oak and Chinquepin oak ; an ally of the scale insects, *Kermes pubescens*, destructive to the same trees, to be kept under control only by spraying ; the walnut worm (*Dartana integerrima*) ; the cottonwood leaf-beetle (*Lina scripta*) ; the poplar leaf-tier (*Melalopha inclusa*) ; the vagabond gall-louse (*Pemphigus vagabundus*) forming flat, lobed projecting galls on willows ; the willow leaf-beetle (*Lina lapponica*) ; the willow flea-beetle (*Crepidodera helxines*) ; the herald (*Scoliopteryx libatrix*), the larvae of which feed on willow, &c., one of the few moths which are indigenous both in North America and in Europe ; the willow slug (*Pteronus ventralis*), &c.—*F. J. C.*

Trees of Togoland. By G. Volkens (*Not. Kônig. Bot. Berlin*, Appendix xxii., No 1, pp. 1–32 ; 10 plates).—This list contains the names of many trees which are useful only as fuel. Among the most valuable on account of their hardness are *Chlorophora excelsa*, *Antiasis africana*, *Ficus umbrosa*, *Faurea speciosa*, *Ximenia americana*, *Xylopia Eminii*, *Parinarium curatellaefolium*, *P. subcordatum*, *Albizzia fastigiata*, *Acacia arabica*, *A. Suma*, *Prosopis oblonga*, *Piptadenia Kerstingii*, *Parkia africana*, *Erythroplocum guineense*, *Detarium microcarpum*, *Afzelia africana*, *Dialium guineense*, *Distemonanthus Benthamianus*, *Cassia Sieberiana*, *Cordyla africana*, *Ormosia laxiflora*, *Baphia nitida*, or Camwood, *Pterocarpus erinaceus*, *Erythrina senegalensis*, *Balanites aegyptica*, *Limonia Warneckei*, *Khaya senegalensis*, *Pseudocedrela Kotschyi*, *Carapa procera*, *Melia Azedarach*, *Ekebergia senegalensis*, *Trichilia emetica*, *Mangifera indica*, *Anacardium occidentale*, *Spondias lutea*, *Ericodum Kerstingii*, *Talsiopsis oliviformis*, *Zizyphus Jujuba*, *Thespesia populnea*, *Cola cordifolia*, *Ochna Afzelii*, *Pontadesma Kerstingii*, *Rhizophora Mangle*, *Terminalia dictyoneura*, *Anogeisseus leiocarpa*, *Syzygium guineense*, *Peucedanum araliaceum*, *Butyrospermum Parkii*, and *Malacantha Warneckeana*.—*S. E. W.*

Tropical Fruits in Covent Garden. By H. F. Macmillan (*Gard. Chron.*, No. 1,148, p. 443, figs. 177–181, and supplement, December 26, 1908).—A short account is given of each of the various kinds of tropical fruits which have recently been for sale in Covent Garden Market; the author says "it may be of interest to give a few particulars concerning these, as well as descriptive notes from my own experience in the tropics." The paper is a decidedly interesting one.—*G. S. S.*

Tunica Saxifraga, Double. By G. T. Grignan (*Rev. Hort.*, December 1, 1908, pp. 543, 544; one illustration).—The illustration represents a very pretty and floriferous specimen of this Saxifrage, evidently well fitted for rockeries or pot culture.—*C. T. D.*

Tyloses. By Hermann von Alten (*Bot. Zeit.* 67th Jah, Aug. 29, 1909, Heft i, pp. 1–23, with 4 figures and 1 plate).—A very useful summary and discussion of what is known with regard to tyloses. An unknown writer in 1845 correctly explained them as protuberances of the surrounding parenchyma cells into the cavities of the vessels. They may be the result of reduced tissue tension in the vessels owing to a wound, or to an abnormally low gas pressure caused in old wood by the cessation of water conduction. They sometimes close up or seal the vascular tissue, preventing loss of water, but in the case of climbing plants they may assist in the ascent of sap by diminishing the width of the vessels. Sometimes they act as 'pumps' pressing out carbonic acid into the sap and extracting from it nutritive salts. There is also a useful bibliography.—*G. H. S.-E.*

Weight, Measurements of, Increase in. (*Beih. Bot. Centralbl.*, xxiv., Erste Abth., Heft 1, pp. 45 *et seq*; with four figures.)—Dr. Hugo Hackenberg gives a series of tables dealing with the rate of increase in dry weight of *Cannabis sativa* and *C. gigantea*. The "substance quotient" is obtained as follows: Specimens are taken at fixed intervals; the average dry weight at each period is then divided by that found at the preceding time of measurement.

The seedlings one week old were 3·3 to 6·7 per cent. lighter in dry weight than the same number of seeds before planting.

After this period there is an increase in dry weight, and the substance quotient varies from 1·9 to 2·5. After the difference in sex is perceptible, the male plants increase more slowly than the females. In some of the male plants the weight was actually less after flowering (due to loss of leaves and pollen).

The quotient curves seem to be independent of normal climatic fluctuations. The plants assimilated with the same regularity in spite of unfavourable conditions. But when a series of both male and female plants were grown in shade the quotients were distinctly lower in the shaded plants, and the dry weight was very much smaller than in the control sun-plants.

The male plants were more injuriously affected by shade than the female ones.—*G. F. S.-E.*

Woburn, Ninth Report, 1908. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S.—This Report deals mainly with experiments in unorthodox methods of planting, and these have been conducted on a larger scale than would otherwise have been the case owing to the attention, not altogether favourable, attracted by the portions of the Fifth Report which dealt with the same subject. The fact that the trials have been made with over 2,000 trees, planted by ten persons in seventeen localities, compels us to give the conclusions arrived at our earnest attention, however much they may be at variance with our preconceived notions and the accepted ideas of good practice. See notes under "Fruit Trees" and "Paradise Stocks."—*A. P.*

Woburn, Tenth Report, 1909. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S.—This Report is founded on observations made during 1908 on the treatment of trees for insect pests. See notes under "Insecticides," "Psylla," "Paraffin," and "Woolly Aphis." *A. P.*

Woolly Aphis on Nursery Stock and Young Trees. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Tenth Report*, 1909, pp. 2–12).—Fumigation with hydrocyanic acid being dangerous alike to the operator and the trees, and not always fatal to the aphis, two simple and effective substitutes have been found for it—the bodily immersion of the trees in petrol (not ordinary lighting oil) for five minutes, or in water at 115° F. for ten minutes, the latter method being recommended as it entails less risk to the trees, the mortality among them being only 5 per cent. as against 10 per cent. after the petrol treatment. *A. P.*

Yew, Distribution of, in Germany. By F. Kollmann (*Nat. Zeit. Land-Forst.*, Vol. 7, pp. 217–247, 6 figures, April 1909).—Notes on the occurrence of yew in various parts of Germany as a wild plant.—*W. G. S.*

Erratum

P. lxix of last part. Description under illustration should read :

FIG. 29.—ODONTIODA × BRADSHAWIAE, COOKSON'S VARIETY. (*Gardeners' Chronicle.*)
(p. lxviii.)

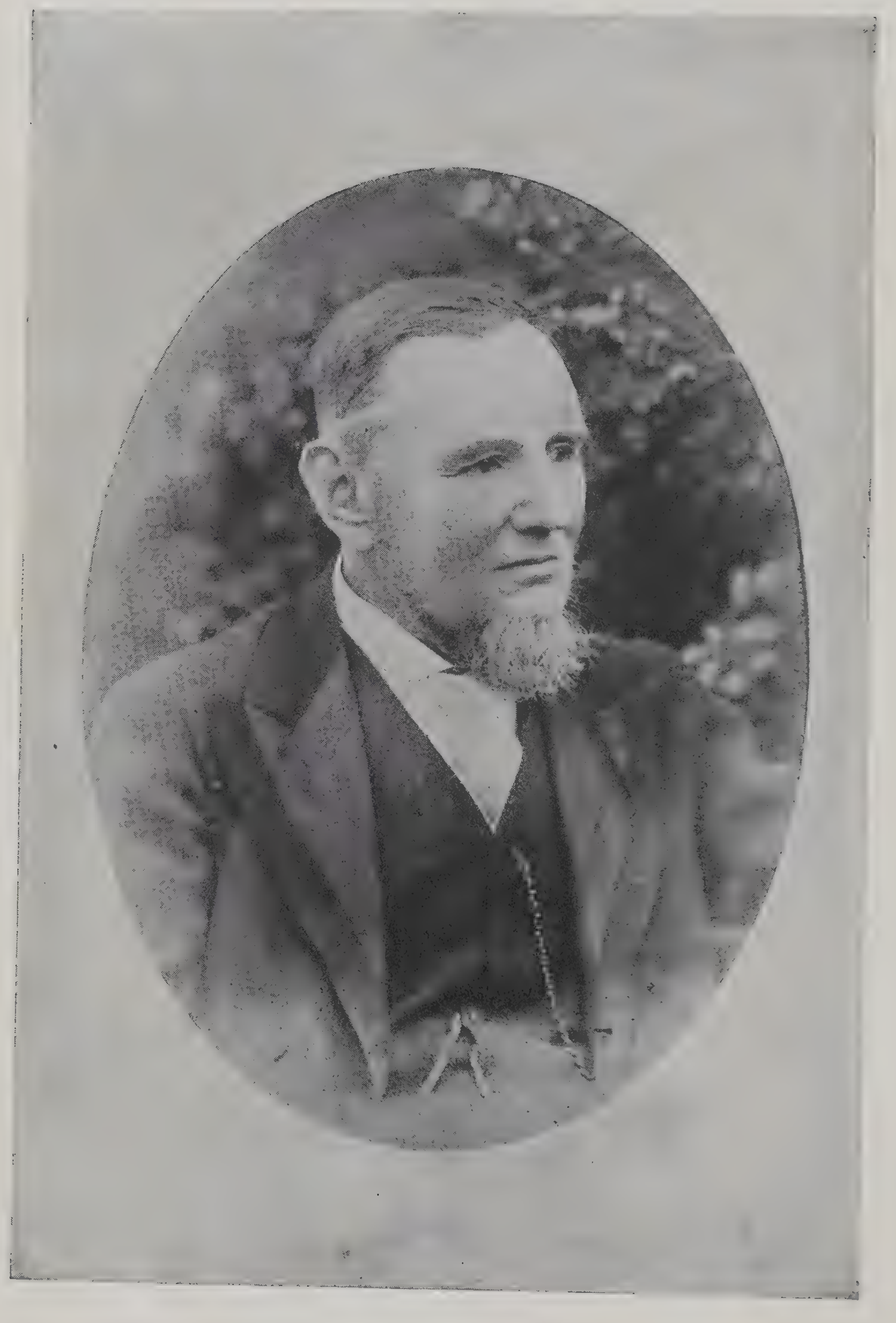

Fig. 35.—The late Dr. M. T. Masters, F.R.S., F.L.S.

(*To face page* 153.)

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PART II.

THE MASTERS MEMORIAL LECTURES.

DR. MAXWELL T. MASTERS, F.R.S., F.L.S. (1833–1907), at the time of his death was officially connected with our Society as its Foreign Corresponding Secretary and as Acting-Chairman of the Scientific Committee. His connexion with that Committee had continued without a break from its inception in 1868, and his acting-chairmanship from the time when, on his retirement from the Royal Gardens, Kew, Sir Joseph Hooker, K.C.V.O., F.R.S., F.L.S., V.M.H., still, happily, the Chairman of the Committee, was obliged to withdraw from taking an active part in its meetings.

Dr. Masters always looked forward to the meetings of the Committee with pleasure and never grudged the time they took out of his busy life, but maintained a keen and never-flagging interest in its work. His kindly firmness, his ready sympathy, and his wide knowledge of botanical science, always at the service of his colleagues, made him an ideal chairman and endeared him to all the members of that Committee.

Not only was he possessed of wide knowledge but he had in a rare degree the faculty of being able to impart to others the knowledge he possessed. In his many writings, especially in the 'Gardeners' Chronicle,' of which he was Editor, and his lucid lectures, he never lost an opportunity of showing, in language to be "understanded of the people," how the discoveries of science might be utilized in the service of the practical horticulturist.

In order that his memory should be kept alive the Council of our Society invited the Fellows to subscribe towards a fund for the establishment of annual lectures by eminent men of science, who would bring before the body of horticulturists the newest discoveries in the sciences they had made their own, believing that thus the good work which Dr. Masters did so well might be continued and extended.

The first of the "Masters Lectures" was delivered on June 22, 1909, by Professor Hugo de Vries, of the University of Amsterdam. The text of this lecture is given below.

MASTERS' BOOK ON VEGETABLE TERATOLOGY.

By Professor Hugo de Vries.

[Being the first "Masters Lecture."]

Horticulture and botany, practice and science, have always been most intimately connected. The philosophical mind of the student of nature is anxious to discover the laws which give the clue to an explanation of the phenomena he observes. From time immemorial the best way to find this clue has been the combination of the facts scattered over large fields of human knowledge. The florist looks for his information to botany, and the botanist enlarges his views by the study of horticultural observations.

Broad conceptions and far-reaching theories have been the result of this mutual co-operation and the doctrine of evolution is based on scientific inquiry as well as on the experience of plant and animal breeders.

Among the men who have worked along these philosophical lines of thought, our Society honours in the first place the name of Dr. Maxwell Tylden Masters. In commemoration of him these lectures have been instituted. The fact that the first of them has been committed to a botanist is a proof of our wish to continue his work along the same broad lines. Mainly through his influence English horticulture has developed itself on a sound scientific basis, whilst English botany has learned to avail itself of the many data afforded by horticultural practice.

Physiology and morphology are both concerned in the elaboration of the combined field. Masters, however, preferred the morphological side of the questions. He thoroughly appreciated the morphological ideas of Goethe and repeatedly pointed out the corroboration given to them by the observations of florists. Their bearing on the problems of the systematists, on the conception of species and varieties, and even on the broad lines of the evolution of the vegetable kingdom, were all equally dear to him. Almost unlimited were the facts at his command, many of them new to science or linking previously separated groups of phenomena. He not only recorded them for the use of others, but always carefully indicated the lines in which science might utilize them.

His most prominent work in this field is his book on Vegetable Teratology. It is an inexhaustible source of information arranged in a clear and logical way. Teratology has always presented special attractions to students and amateurs. With a book like this in hand, they can easily estimate the importance of any apparently new case and investigate it in proportion to its relation to already described cases. In doing so, every florist can contribute his part to the development of the science, and no opportunity that offers itself needs to be lost through want of information.

It is now exactly forty years since the Ray Society published this volume. At that time Darwin's ideas on evolution were triumphing over their antagonists and widening their influence on all branches of biological research. Masters warmly sympathized with them. He never allowed himself to digress upon the purely theoretical side of his deductions from the collected facts, but was content with simply hinting at it. For the student in evolution these hints are most valuable; they clearly show that Masters was well aware of the significance of his facts and knew how to utilize them for the solution of great problems. We have only to follow his indications and to work them out in order to find the support teratology gives to the doctrine of evolution. I may here quote the concluding sentence of the book, which clearly shows the principles by which the author was guided. He says:—

"That monstrosities so called may become the starting points of new forms is proved by the circumstance that, in many cases, the peculiarities are inherited, so that a new race is produced and perpetuated, *and if a new race, why not a new species?* The difference is only one of degree" (p. 490).

His "Vegetable Teratology" is the greatest work of his life. When still a young man he commenced collecting the material and compiling the literature of the subject. He did so at the suggestion of his friend, James Salter. From 1855 to 1868 he was Botanical Lecturer at St. George's Hospital and for some years was Examiner in Botany at the University of London. It is especially during this time that he prepared his great work. At the age of twenty-four years (1857) he published his first contribution to the science of teratology in the "Phytologist" (Vol. II.) It was succeeded by numerous articles on the same subject in various publications. The material rapidly increased and enabled him to give "An account of the principal deviations from the usual construction of plants," as the second title of his book expresses it. It was a collection of facts, rather than the propounding of a theory, and met with universal acceptance. It is still unsurpassed and even the appearance of the work of Penzig could not make it superfluous. Penzig's book is on a systematic basis, whereas Masters' followed a morphological scheme.

Shortly before finishing his classic work, in November 1865, Dr. Masters became Associate Editor of the "Gardeners' Chronicle." From that moment he gave all his time and all his energy to this Journal and everyone knows how the influence of his mind, character and ability has been stamped upon its pages. His book was soon out of print, but it was impossible for him to prepare a new edition. The pages of the "Chronicle" were full of contributions to his beloved science, but he found himself constrained to leave their application to another. This task has been taken up by a German botanist. Udo Dammer prepared and published a translation of Masters' book, using Masters' later material and aided therein by the author himself. Almost every page of the translation betrays the help of the author, and numerous additions and corrections enhance the importance of the work. New pictures from the "Gardeners' Chonicle" give it additional weight.

The classification of malformations to be adopted in his book was a source of much consideration and trouble to the author. Of course a comparative study of the nature of the causes introducing the several changes would afford the most logical basis. But the material at hand did not satisfy this demand, and it was found impracticable to carry it out. In consequence of this, another plan was followed. The aim was to enable the reader to detect the kind of monstrosity he happens to have observed in nature, and to place in his hands all the information he wants in his study of such cases. The morphological point of view answered these requirements, and explanatory remarks, illustrative details, and a summary of the more important facts and conclusions accompany each chapter. The larger number of the cases described rested on personal observations of the author, and numerous figures, either from his sketches or from his preparations, illustrate the text.

The main parts of the book describe the deviations from the ordinary type under four headings. These are: the arrangement of organs, their form and number and their size and structure. These four parts are divided into chapters according to the morphological principles. Union and separation of organs, increased and decreased number, changes of form, suppression of parts and hypertrophy, abortion and degeneration are some of the more important subdivisions.

But, although the description of anomalies forms the bulk of the book, the influence of the philosophical mind of the author is seen everywhere. Teratology serves as an aid in the study of morphology in general, as well as in that of special groups of plants. It is often a more trustworthy guide in the solution of such problems than even the study of the development of organs. Teratology indicates the primitive structure of the flower in many groups of the higher plants; it implies the hypothesis of a prior simplicity of organization. The author lays great stress upon its bearings on systematic botany. Where broader considerations are concerned, teratology affords aid in speculations concerning the affinities and genealogical descent of species, of genera and of larger groups. In many cases ordinary morphology is insufficient, but the study of anomalies may give the clue. The anomalies are not indeed, deviations from the common laws, but simply expressions of these laws within less narrow limits. They give indications of atavism as well as of progressive changes. Relationships, otherwise unsuspected, may be disclosed by them. Numerous are the contributions of this study to the philosophical conception of the conformation of plants or of the affinities existing between them.

* * * * * * * * *

I shall now endeavour to give a short survey of the trend of the book, by making a selection from among its rich contents. We may begin with the chapter on metamorphy, or the change of form. The best known instance is that of the change of stamens into petals, which Masters calls their petalody.

Our first example is afforded by the double flowers of the crane's bill (fig. 36). Here the stamens are changed into petals, and all the different stages of this change can easily be found. The petal formation is brought about by the broadening of the filament and of the connective, the anther lobes being separated and attached to the margin of the band. While this increases in breadth, the anther lobes diminish in size, lose their contents and ultimately disappear. At the end the whole stamen is dilated into a petal of normal structure and size. Some flowers are rich, others poor, in these malformations. Sometimes one or two stamens are slightly affected, or the flower becomes semi-double or fully double. All the numerous intermediate forms between true petals and perfect stamens may be seen on the same plant, and not rarely a series of transitions of forms is observed in a single flower.

From a careful study of numerous cases of petalody, Masters derives the conclusion that the homology of the floral organs is usually not so much with the entire leaf of a plant as with its sheath. In the case before us, we may observe how the stamens, in dilating and assuming petaloid structure, at first produce those little appendices along their sides which evidently correspond to the stipules of green leaves.

Masters then recalls the views of Goethe concerning the essential morphological identity of the various whorls of the flower and its corroboration in the frequent appearance of one organ in the guise of another. It would take us too long to follow him into all his arguments; it is quite sufficient to state the fact, in order to indicate how the philosophical aspect of the phenomena observed was always uppermost in his mind.

Double flowers, sometimes, have all their organs changed into petals, or rather refrain from producing anything save petals. In analysing the very heart of the flower, we find the same scheme repeated almost without limitation, more young petals being produced for development than the flower is able to display. Sometimes the axis of the flower is abnormally lengthened, as in some instances of the double crowfoot (fig. 37) of our gardens, separating dense groups of petals and producing the appearance of a series of superimposed flowers. At other times, the petals are equally distributed along a lengthened axis, as in the white lily.

Petalody of the connective is seen in some forms of the double columbine (fig. 38), in which this part of the stamen forms a tubular petal or nectary. These nectaries are not rarely repeated, a single stamen producing a series of them, which seem to slide into one another.

From petalody there is only one step to phyllody, or the change of floral organs into green bracts and leaves. It is an anomaly of very frequent occurrence. In the green rose all the parts of the flower have become small green leaves (fig. 39). The stamens show the same malformations as in ordinary double flowers, but the dilated parts are green, instead of having the colours of normal petals.

The reduction of the flowers to sterile corollas, and even to simple coloured stalks, is seen in a very beautiful example, the feather hyacinth (fig. 40). In this case it is combined with an increased number and with their branching. The supernumerary pedicels are brightly coloured and attract insects, which, however, can find neither pollen nor honey in them. From the morphological point of view we may consider the absence of flowers as compensated for by the formation of brightly coloured modified pedicels. For the evolutionist they constitute an increase of the change which the species itself shows in comparison with its allies. Its special character is the little tuft of coloured, but sterile flowers on the summit of the spike; these organs are more or less reduced in size and organization, the more so the higher they are placed on the tuft. The highest ones may be considered the prototype of the feather-like pedicels of the variety.

Another instance of reduction of flowers is seen in a most curious abnormality in maize (fig. 41), which, from time to time, although very rarely, occurs in cultures of the normal sorts. All the flowers of the male spike are absent; sometimes a small tuft of bracts or of little naked branches is seen at the top, but, often, even this is absent and the whole spike is reduced to a single spindle. Here not only the absolute bulk of the inflorescence is diminished, but the whole form is altered and depauperated. It is therefore to be described as a case of degeneration.

In the wheat-ear carnation also the flowers are absent, but replaced by green ears of little bracts (fig. 42). These bracts are the same as those which, in the ordinary carnation, are found at the base of the flower. Here they are arranged in alternating pairs, only a small number of such pairs protecting the lower part of the calyx of each flower. In the wheat-ear carnation there is an increase of the number of these bracts, so as to produce the appearance of ears. As the whole flower is suppressed the variety becomes sterile. This monstrosity can be multiplied and preserved by cuttings, but from a horticultural point of view there is, evidently, no use in doing so. On the other hand, many varieties of our garden carnations produce the wheat-ear plants, from time to time, and it is, perhaps, the most interesting instance of a species producing the same striking anomaly at irregular intervals of time.

These wheat-ear carnations are sometimes seen to produce instances of reversion or atavism. In such cases the plant bears some normal flowers among the mass of green ears. Intermediate forms arise, constituting small or only partly developed flowers on the top of green ears, or better organized flowers with only some supernumerary pairs of bracts at their base. This is an instance of atavism, showing how the lost qualities of the species are not absolutely lost, but simply reduced to the latent condition. In this connexion, it is most interesting to see how the atavistic flowers on the wheat-ear plants do not revert to the original wild type of the carnation, but to the special characters of the variety from which they sprang. In my own garden, a wheat-ear carnation reverted in this manner and produced beautifully doubled dark-brown flowers, which it had evidently inherited, though in latent condition, from its parent-variety.

Here we recognize, in a most typical case, the bearing of the science of teratology on the doctrine of evolution. In cases of specific or generic atavism, the parents to which a form reverts are not, of course, empirically known, and the whole explanation rests on an hypothesis. In the wheat-ear carnation, on the other hand, the parents from which they sprang are always still in cultivation, and the reversions may be directly compared with them. The conception of atavism is no longer an hypothesis, but is supported by a complete set of facts and observations.

One of the most curious instances of an hereditary anomaly is the Nepaul barley. It is a cultivated and constant variety, which has attracted the attention of many botanists. Masters gives a full description of it, with many figures, some of which are reproduced in fig. 43. In the ears of this plant, it is the outer palea which shows the deviation from

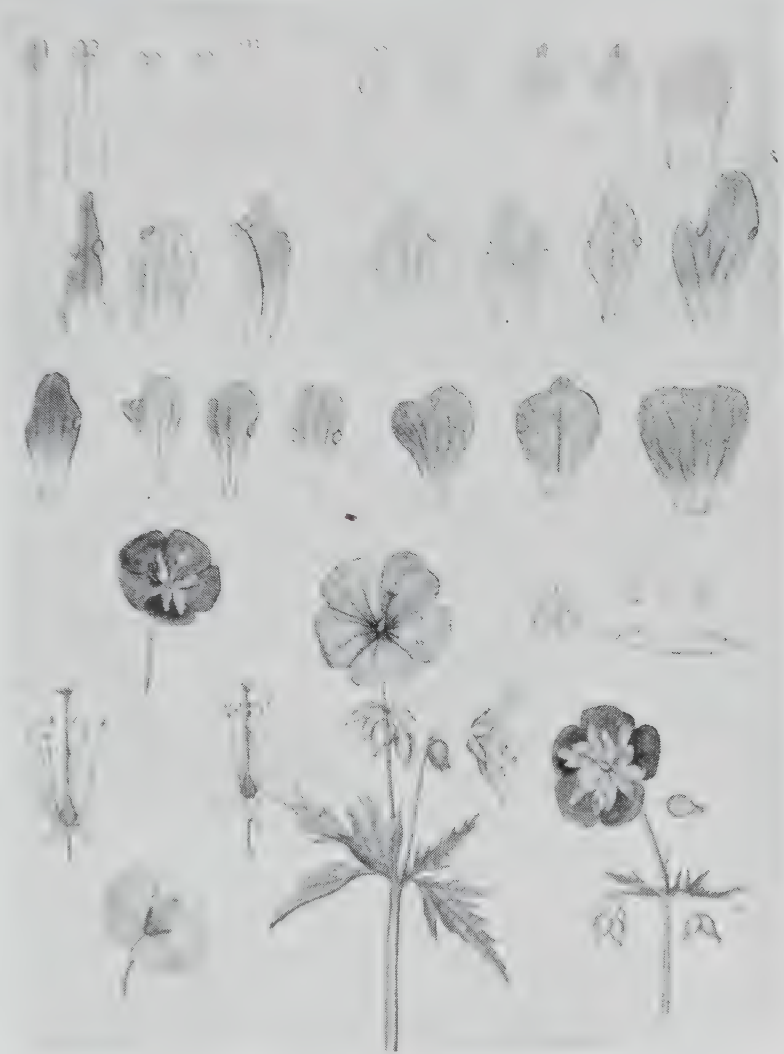

Fig. 36.—Petalody of the Stamens in the Double Flowers of the Crane's Bill (Geranium pratense). Stamens gradually changing into Petals. Single, Semi-double, and Double Flowers. Cross-sections of Normal and of Petaloid Stamens.

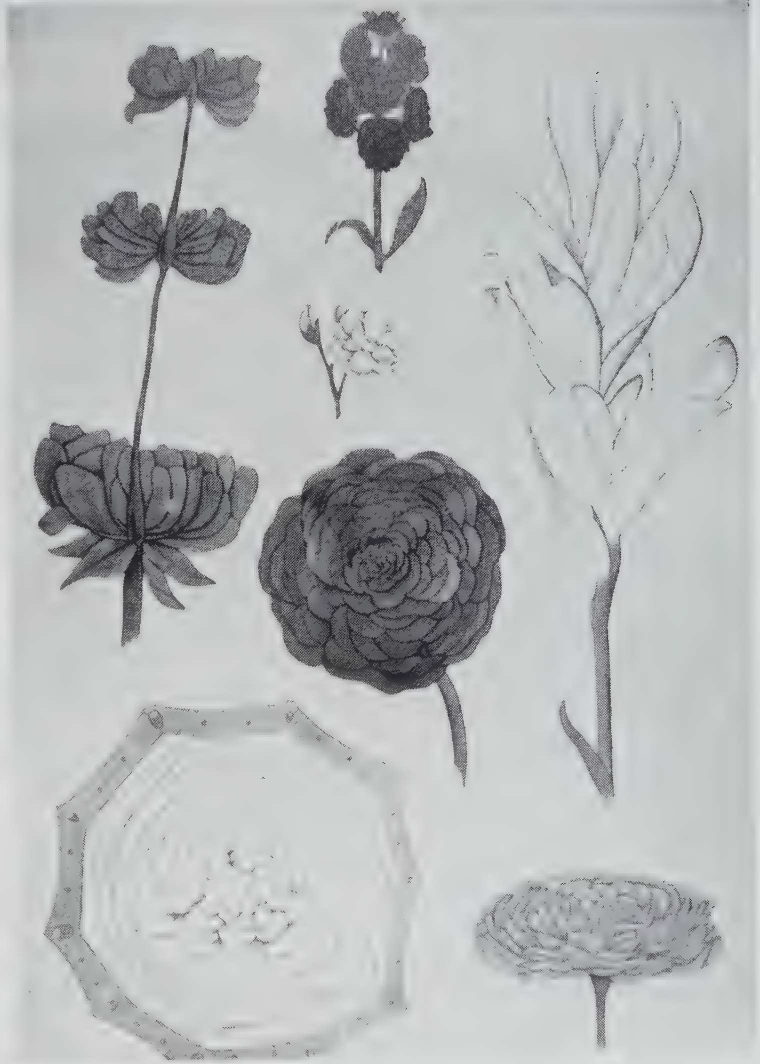

Fig. 37.—Petalonomy. Double Flowers of the Garden Crowfoot (Ranunculus asiaticus), of the Buttercup (R. acris), of the Stock, and of the White Lily. Cross-section of a Petalomanous Flower of Lychnis chalcedonica.

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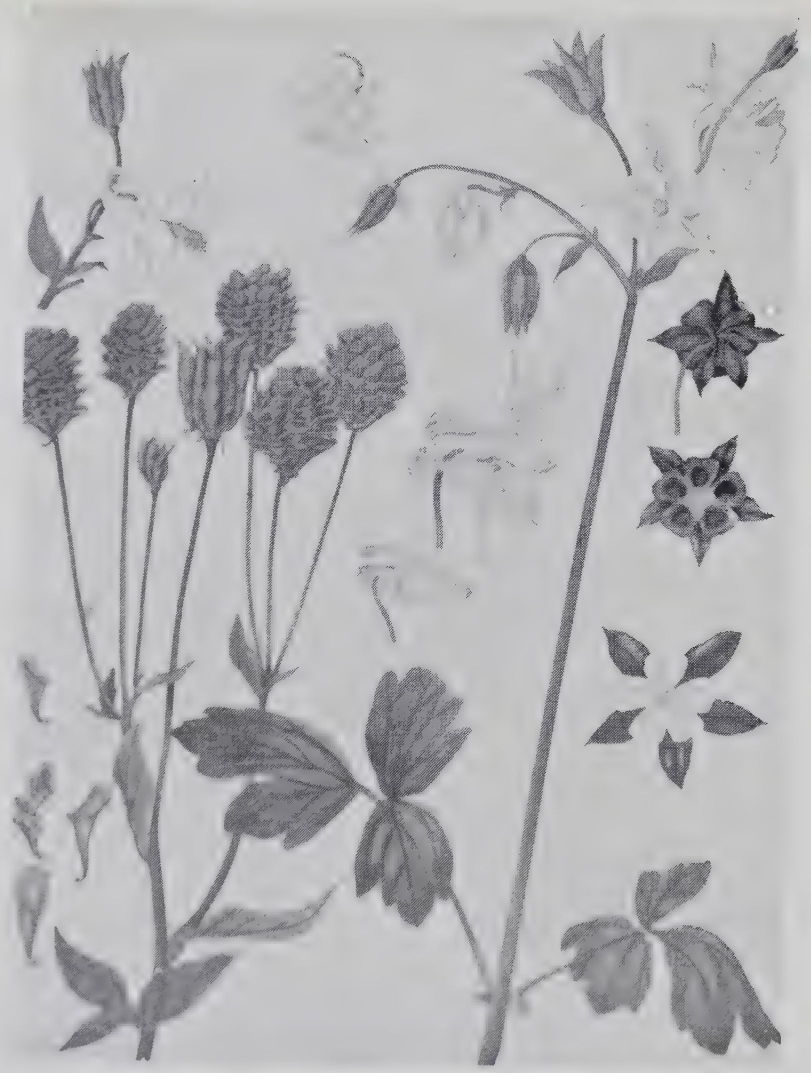

Fig. 38.—Different Varieties of the Columbine (Aquilegia). To the left the erect Dwarf Form with Double Flowers, and the Tubular Connectives of its Stamens.

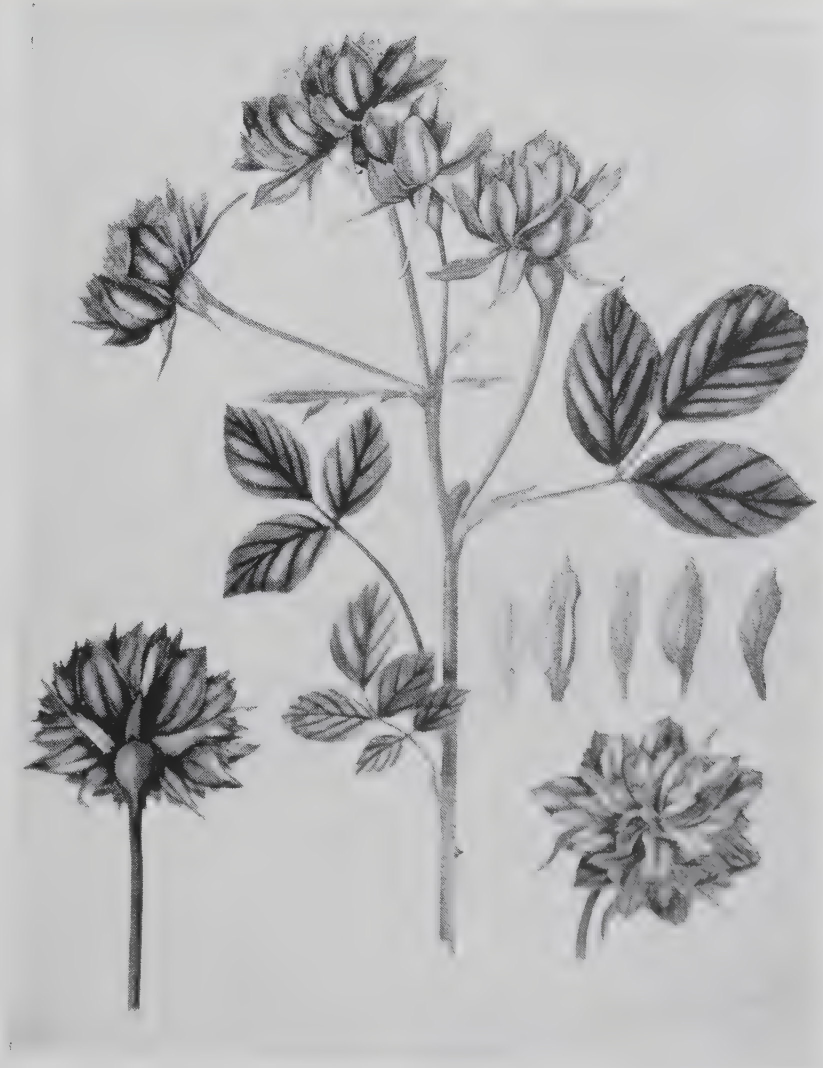

Fig. 39.—The Green Rose and some of its Stamens changing to Green Leaflets.

the ordinary type. This lower scale, which in other varieties of barley bears the awn, here forms an inverted flower-bud upon its midrib. It is three-lobed at the summit. The central lobe is oblong and hollow, forming a kind of hood and covered with hairs. In its cavity the supernumerary floret is developed. Ordinarily there is only one, and that is rudimentary, but sometimes two or three of them are seen, each belonging to one of the three lobes of the scale.

The three lobes are to be considered as shortened awns or as a three-lobed appendix representing the awn. The length of these awns is highly variable, and this quality is perhaps the most striking in the variety. They often reach only 1–2 mm., or the majority may become longer and attain even one centimetre, while here and there, between them, longer ones are inserted, extending in some instances even as far as 3 cm. from the spike. Their transverse position, in such cases, is strikingly contrasted with the ordinary erect position of the awns.

The accidental flower arises at some distance beneath the summit of the scale on its middle vein. The development begins with the protrusion of a little adventitious scale and the flower itself is situated beneath this scale, protected by it, and the primary scale, and in this way turned upside down. The stamens occur in varying numbers; typically there are three of them, but, often, only one or two are developed. The ovary is situated in the middle of the flower and in some instances it has been seen to ripen into a little seed. All these deviations conform to a single type, and it is very probable that all of them have originated in the manner of a single varietal mark. Their high degree of variability may then be compared with that of variegated leaves or of double flowers.

Another case of an hereditary anomaly is that of the peloria of the ordinary foxglove (fig. 44). Rarely is a malformation an isolated phenomenon; almost always it is associated, from the operations of cause or effect, with some others. A change, slight in itself, often acquires importance from its combination with other alterations. This is particularly well seen in the case of the peloriated foxglove. Fission of the corolla, petaloid stamens, supernumerary petals often transformed into narrow tubes and sometimes situated on the outside of the corolla, are some of the many secondary malformations. Increase of number is another, and this is perhaps the most striking feature of this variety. The corolla is enlarged, bordered by twelve or more lobes instead of the normal number of five, and the number of stamens is increased in the same way. Finally, proliferation adds to the complexity of the flower. Within its ovary, small green leaflets often take the place of the ovules; and after the fading away of the corolla, they grow and burst the ovary wall and protrude from it, forming a green tuft of bracts. In other cases, the axis of the peloric flowers elongates itself through the middle of the ovary and develops into a new spike with quite a number of normal flowers, sometimes even producing at its summit another peloric structure which may then repeat all the anomalies.

In different places in his book, Masters has pointed out the necessity of assuming an influence of two sets of causes on the development of monstrosities. One set is internal, the other external.

Internal causes are those inherent in the organization of the plant.

They are, of course, the more important, but external agencies undoubtedly play some part in bringing about these changes. Masters has given a full discussion of this question in the appendix on double flowers, but the peloric foxglove may also be cited as an example. The more so, as the influence of external causes is most easily studied in this case. Our best way is to compare the terminal flowers on the side branches of a plant, with the pelory at the summit of its main spike. On the weaker branches, the peloric flowers become more and more regular. They lose their association with other alterations and tend to become pentamerous. This, of course, would be the condition of a normal flower of the foxglove, were it not for its irregular structure. Or, in other words, we may imagine the ancestors of the species as having had pentamerous and regular, instead of irregular, flowers. This philosophical conception is now seen to be supported by the abnormal flowers on the weakest branches. Here the corolla has lost only its symmetry. It is regularly cupshaped with five small, but equal, lobes. Inside there are five stamens of the same length and a normal ovary.

In comparing side branches of different vigour, we can easily collect a whole series of transitional forms between the two extremes just described.

The peloric foxglove is an hereditary variety. Its seeds have been on the market for more than half a century. It was made an object of botanical inquiry, for the first time, by the Dutch botanist, Vrolik, whose preparations may still be seen in the botanical museum of the University of Amsterdam.

Spiral torsion is the subject of another of the chapters of Masters' book. One of its most interesting instances is afforded by the twisted stems of the wild teasel (figs. 45 and 46, D). Such stems are met with in the field, from time to time, and from their seed I succeeded in starting an hereditary race. It is highly variable and may show the deviation, under appropriate cultivation, in all its individuals, but only part of them will succeed in twisting their main stem over the whole length.

In the normal stem of the teasel, the leaves are arranged in pairs, which alternate with one another and are separated by long and straight internodes, covered with longitudinal ribs. In the twisted stems, on the other hand, the internodes seem to be absent, and the leaves are arranged along a line, constituting a continuous band. This line spirally ascends the stem; its curves are low and numerous in the basal part, but soon become steeper, and not rarely even quite erect. In this case, all the leaves of the main part of the stem are seen to be directed to one side only, thereby giving an extraordinarily strange appearance.

The spiral torsion of the stem corresponds with this arrangement of the leaves. The ribs, which are longitudinal in normal specimens, are themselves twisted. The direction of their spiral is opposite to that of the leaves.

A similar twisting of the stem is, from time to time, met with in other plants, the leaves of which are arranged in pairs or in whorls. The horse-tail (fig. 46, C) and the cleavers (*Galium Aparine*) (fig. 46, B) afford the most common instances. Ordinarily, only a small part of their stem is spirally contorted, the lower and the upper parts being of normal

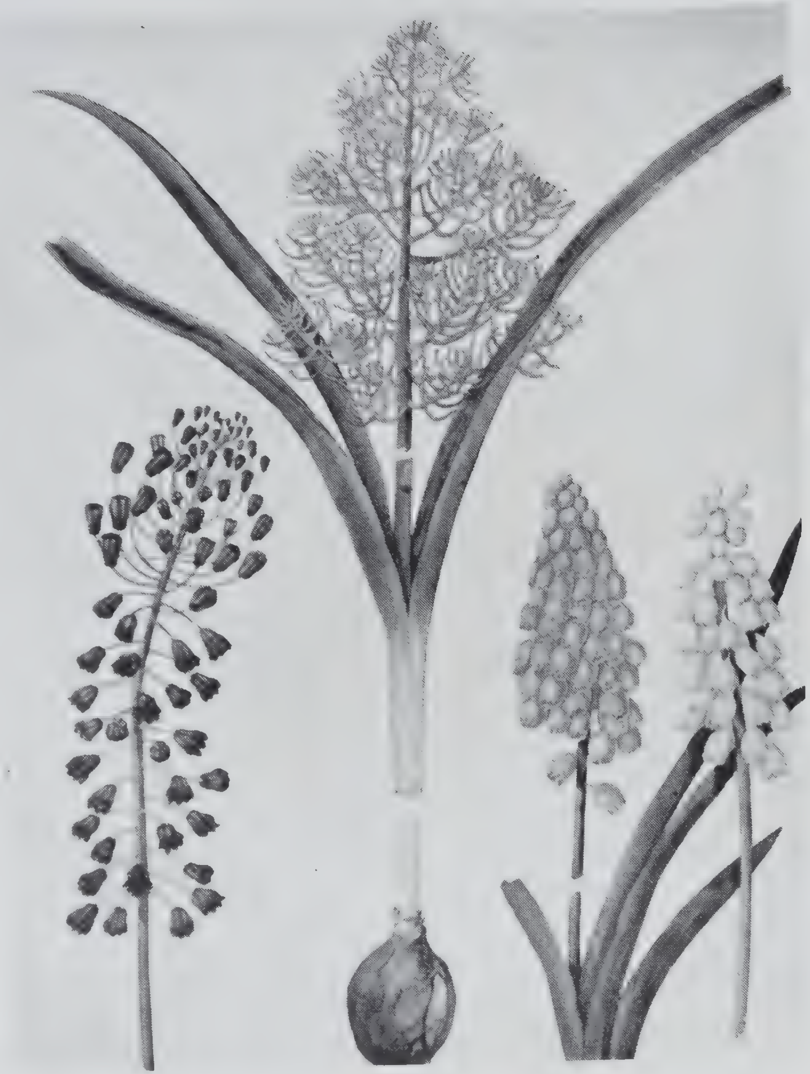

Fig. 40.—The Feather Hyacinth (Muscari comosum plumosum). To the left the ordinary M. comosum, to the right Blue and White Spikes of M. botryoides.

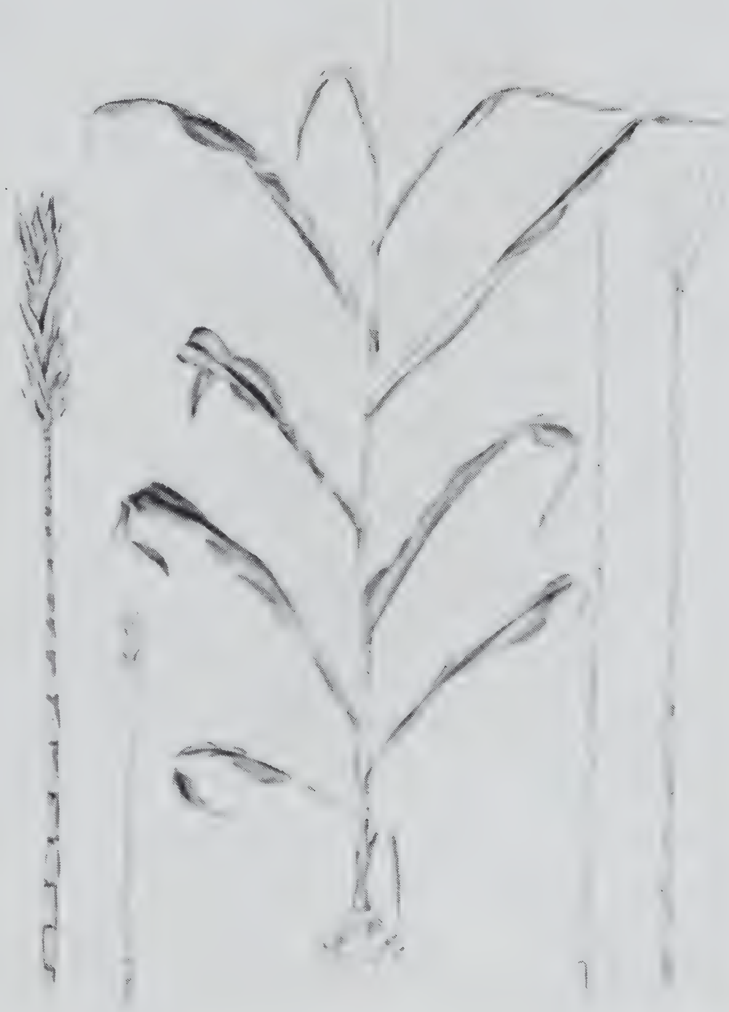

Fig. 41. Sterile Maize with Naked or Almost Naked Shoots instead of the Male Spikes, and without Ears.

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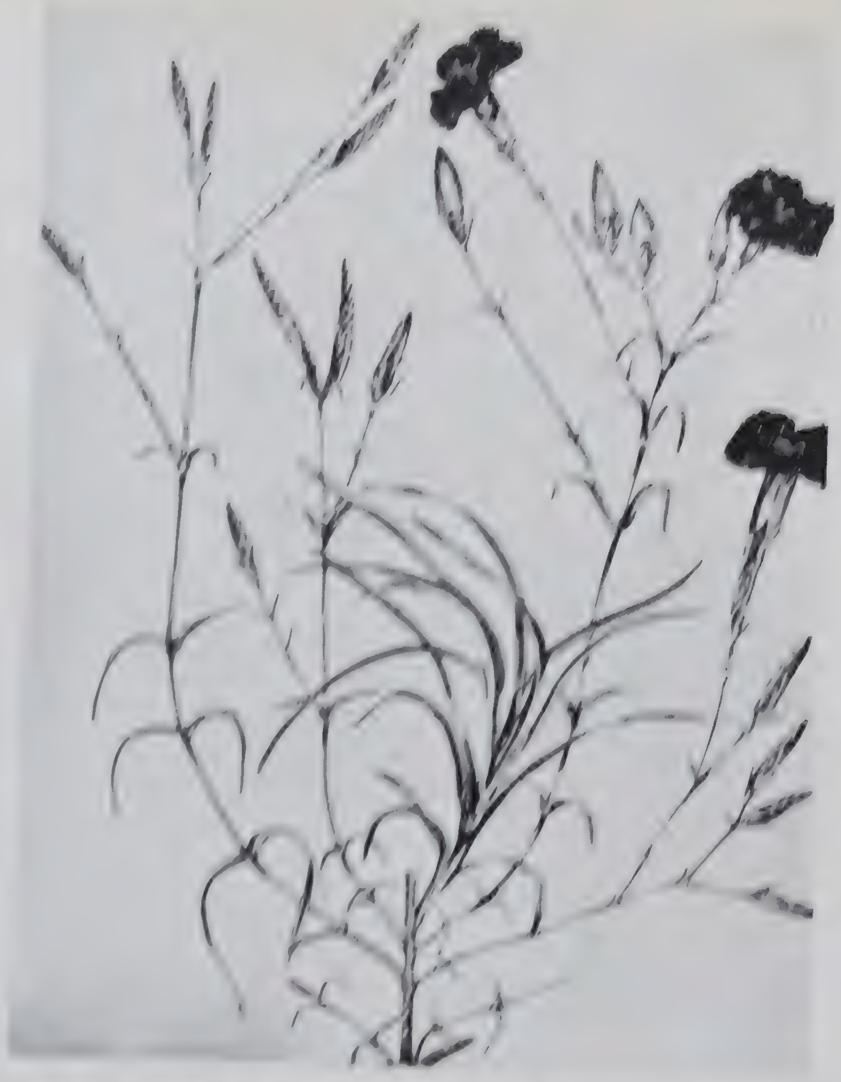

FIG. 14.—[illegible] Carnation (Dianthus caryophyllus [illegible]) On the right a [illegible] showing [illegible] through Bud Variation.

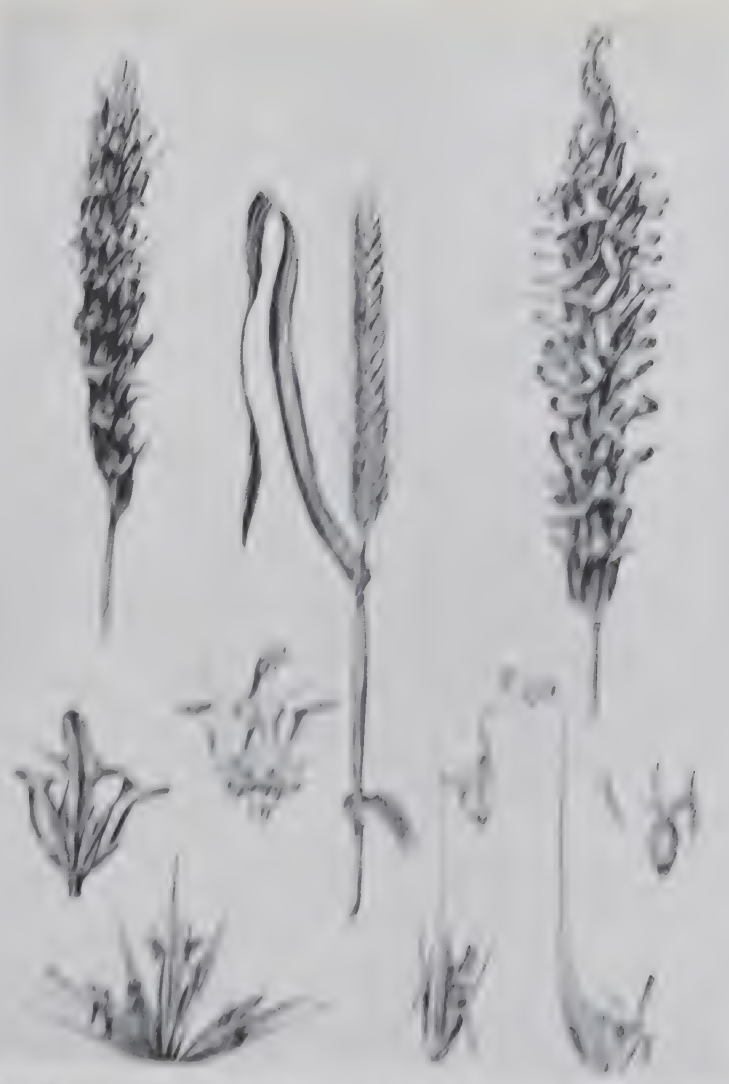

FIG. 13.—[illegible] Barley (Hordeum [illegible]), with a [illegible] Ear of Barley in the middle. Details of Flowers and Spikelets, [illegible] Magnified, with the [illegible] parts of [illegible] Barley.

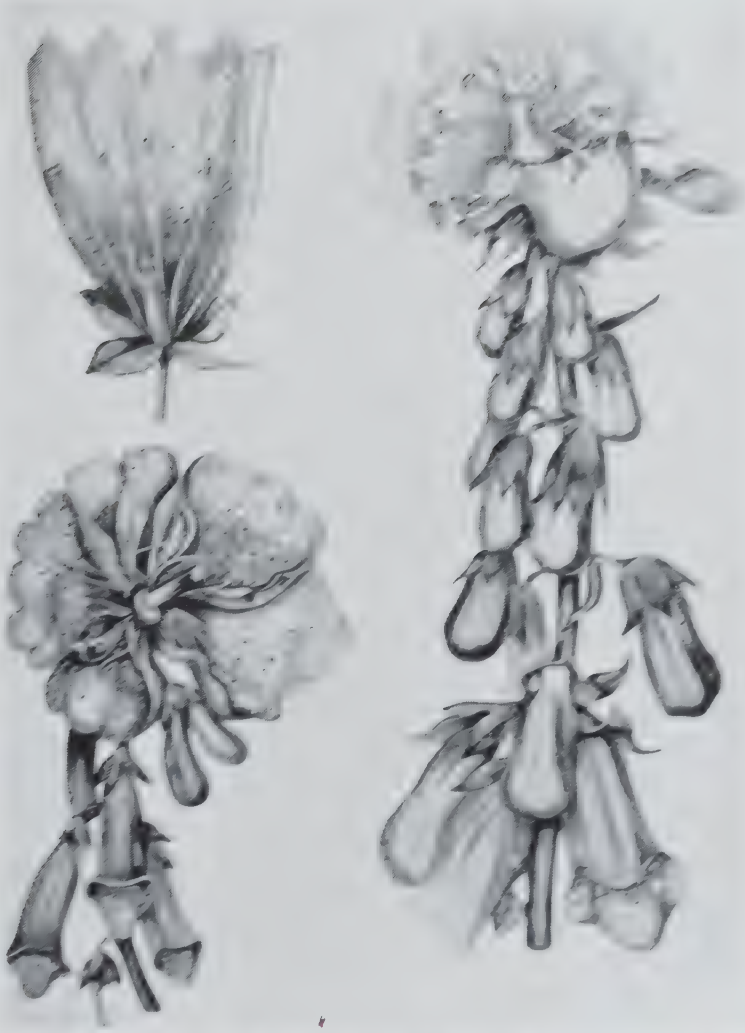

Fig. 41.—Two Peloric Flowers of Foxglove (Digitalis purpurea) [illegible]

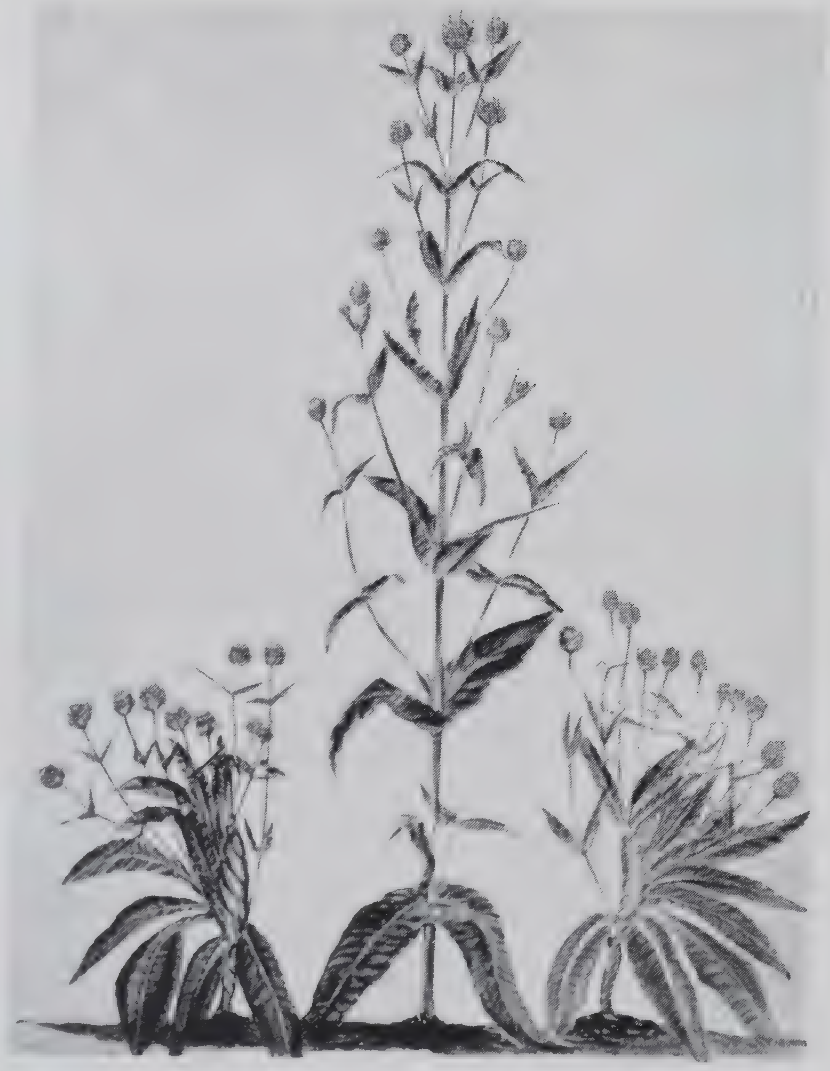

FIG. 45.—WILD TEASEL (DIPSACUS SYLVESTRIS) AND TWO TWISTED SPECIMENS OF THE VARIETY D. S. TORSUS.

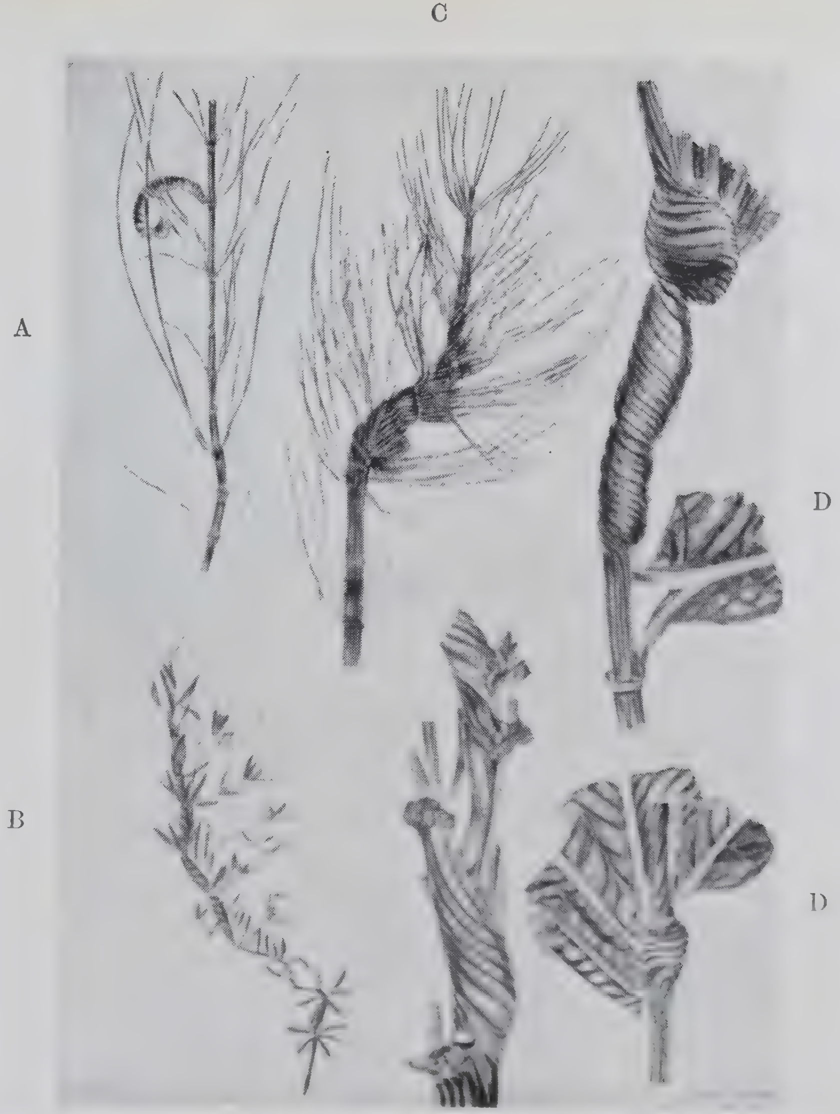

FIG. 46.—PARTIALLY TWISTED STEMS OF (A) CASUARINA; (B) GALIUM APARINE; (C) EQUISETUM MAXIMUM; AND (D) TEASEL (DIPSACUS SYLVESTRIS).

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construction. Other examples may be cited, and the ironwood, or *Casuarina* (fig. 46, A), which is in so many respects like the horse-tails, is sometimes seen, in our conservatories, to twist in the same way. Partial spiral torsions, of course, also occur in the teasel and often give rise to additional anomalies.

Spiral torsion may be considered as a case of complicated atavism, caused mainly by the loss of the position of the leaves in pairs or in whorls. They return to the more primitive spiral arrangement.

This is the main point, and all the other striking deviations may be considered as the mechanical consequences of this primary change. For the evolutionist, this change from whorls into the spiral condition gives proof of the development of the more specialized arrangement, from the undifferentiated, and more common, spiral arrangement.

Laciniate leaves, in some instances, afford examples of correlation. This is a most interesting question, and one to which Masters has given much attention. It gives us an insight into the internal causes of monstrosities. The same anomaly may betray itself in different organs, provided they are homologous. Such is evidently the case with petals and leaves, and from this we may expect to find correlations in their anomalies. Laciniate leaves induce laciniate petals, and the corresponding variety of the ordinary bramble is one of the best known instances (fig. 47).

Pitchers (fig. 48) are, ordinarily, rare abnormalities. In the Magnolia they repeat themselves regularly, but in other plants they are seen but once, or at long intervals only. Some of them are formed from one leaf, others from the two leaves of a pair; and still others from the leaflets of compound leaves, as in the clover. In the case of the lime-tree, individual trees occur which produce pitchers annually and in large numbers, and in the pitcher-plants they form a normal character for whole genera.

Returning now to the abnormal structures of the flowers, two of which are quoted by Masters as giving proof of the importance of teratology for inquiries about the ancestral relations of plants: it is generally assumed that the gamopetalous plants have been derived from the polypetalous groups. Authors may differ on the question whether this has occurred once or several times along the main lines of the pedigree of the plant kingdom. But the conception that free petals are the primitive condition, and that gamopetalous or monopetalous flowers owe their organization to a subsequent cohesion of the petals, may be regarded as universally recognized. From this point of view, the dialysis of a gamopetalous corolla has to be considered as a case of systematic atavism, as a reversion of a species of the higher group to the more primitive condition of older branches of the pedigree.

The Rhododendron (fig. 49) is one of the instances, and it occurs among a group of gamopetalous plants which, curiously enough, include some polypetalous species, such as those of *Ledum* and of *Pyrola*.

Quite the reverse is the case with the perennial poppy. Some of its varieties are producing, from time to time flowers in which the petals are united by their margins, so as to form a large cup (fig. 50). Often the petals are fused together in this way along their whole extent, but in other flowers it is only more or less of their base in which they are so united. It is an anomaly which may be used in speculations on the origin of gamopetaly in the vegetable kingdom. For, when gamopetaly arises as a variation among poppies, it evidently becomes probable that it may have arisen in the same way, in some long past geological epoch, and then have been the origin of the whole systematic group of gamopetalous families. It is one of the most striking cases in which teratology explains systematic affinity. It shows clearly the relation of this science to morphology and taxonomy and it is, in a large measure, to the philosophical mind of Masters that the now almost universal acceptance of this relation is due.

* * * * * * * *

From the work, let us now turn to the man. With his high scientific attainments Masters combined a wonderful capacity, willingness and aptitude for instructing others. His whole career has been one of the most useful in horticultural history. The application of botanical science to gardening was the aim of his life. In return, he was able to collect numerous horticultural facts forming an inexhaustible source of information, especially for the student of practical evolution. His work for the "Gardeners' Chronicle" brought him into close contact with every-day practice and enabled him to guide it on a broad scientific basis. He was a model for us all, and his example will remain for ever an incentive to our best efforts. At the end of this first lecture, let us bring him the tribute of our gratitude!

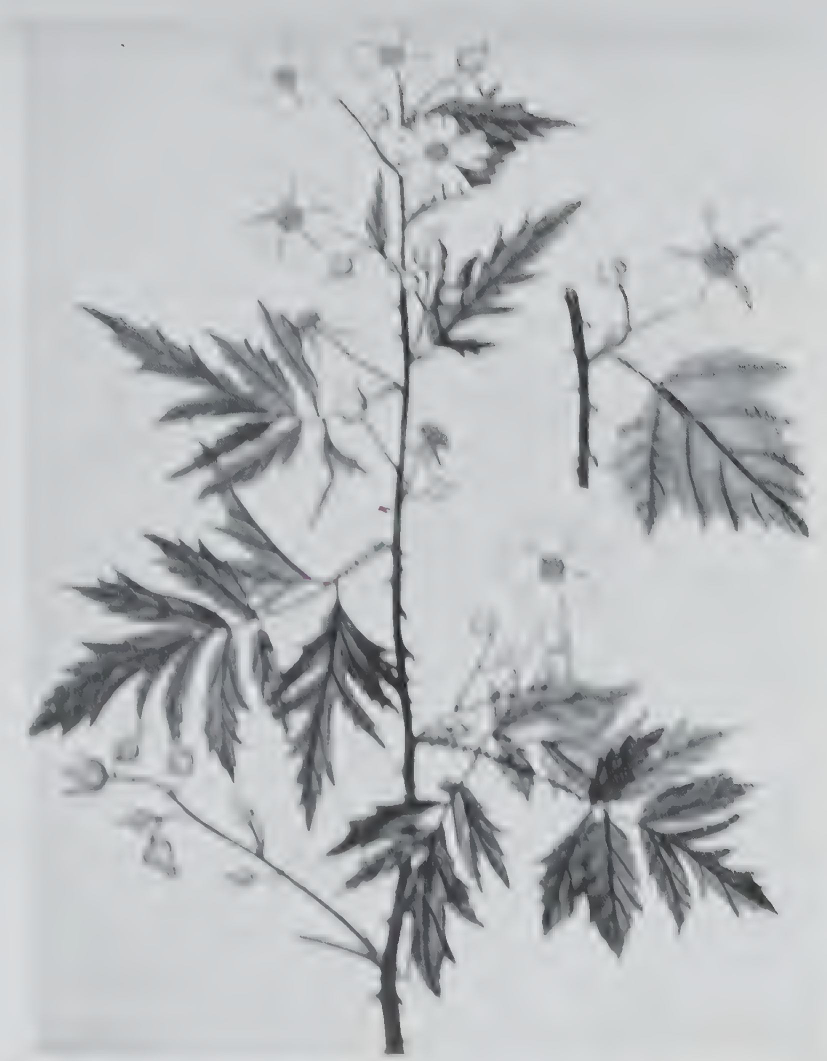

FIG. 47. THE LACINIATE BRAMBLE (RUBUS LACINIATUS), SHOWING THE DEEPLY-DIVIDED LEAVES AND FLOWERS. TO THE RIGHT A LEAF AND FLOWER OF THE ORDINARY BRAMBLE.

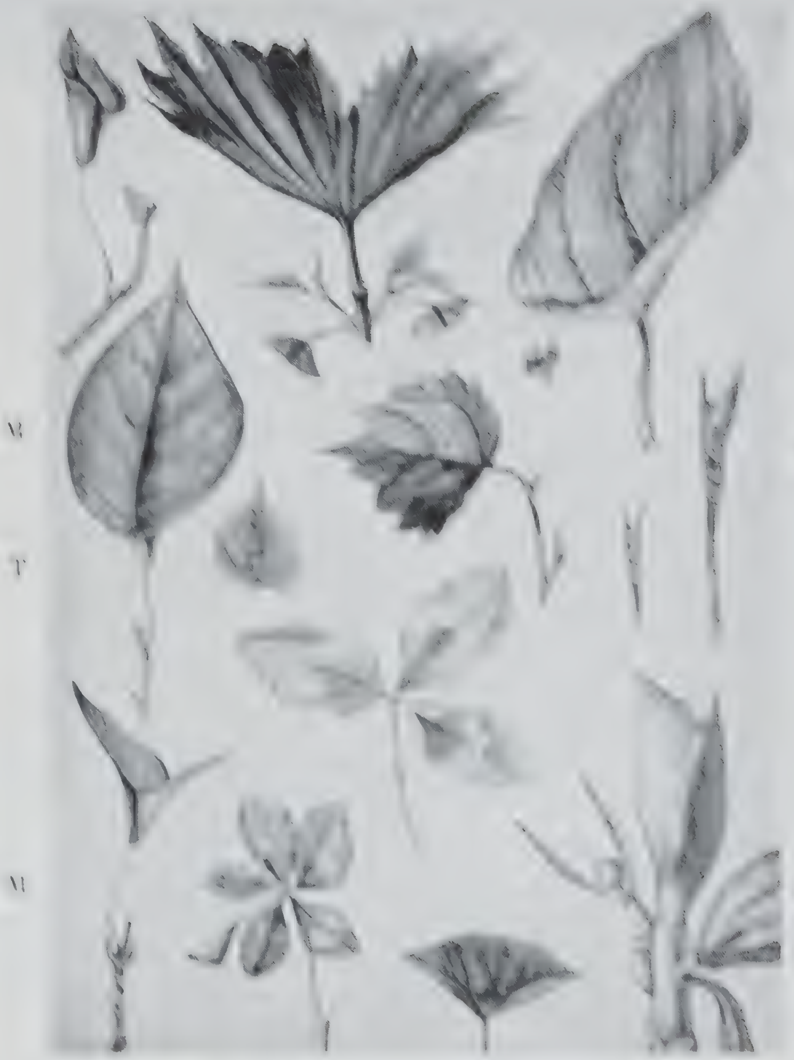

FIG. 48. PITCHERS OF MAGNOLIA (M), BEDSTRAW (B), SYCAMORE (S), TULIP TREE (T), CLEMATIS (C), RED CLOVER (R.C.), PLANTAIN (P).

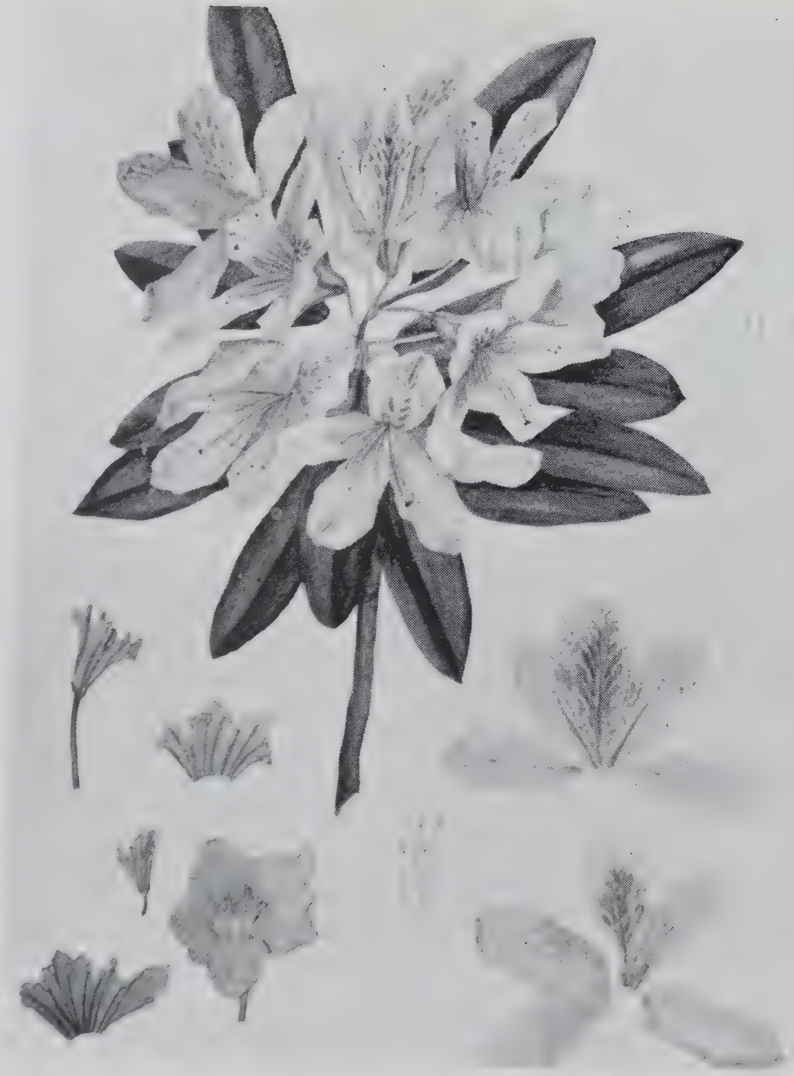

Fig. 49. Rhododendron ponticum. To the left Details of Double Flowers; to the right Flowers with Partially Free Petals.

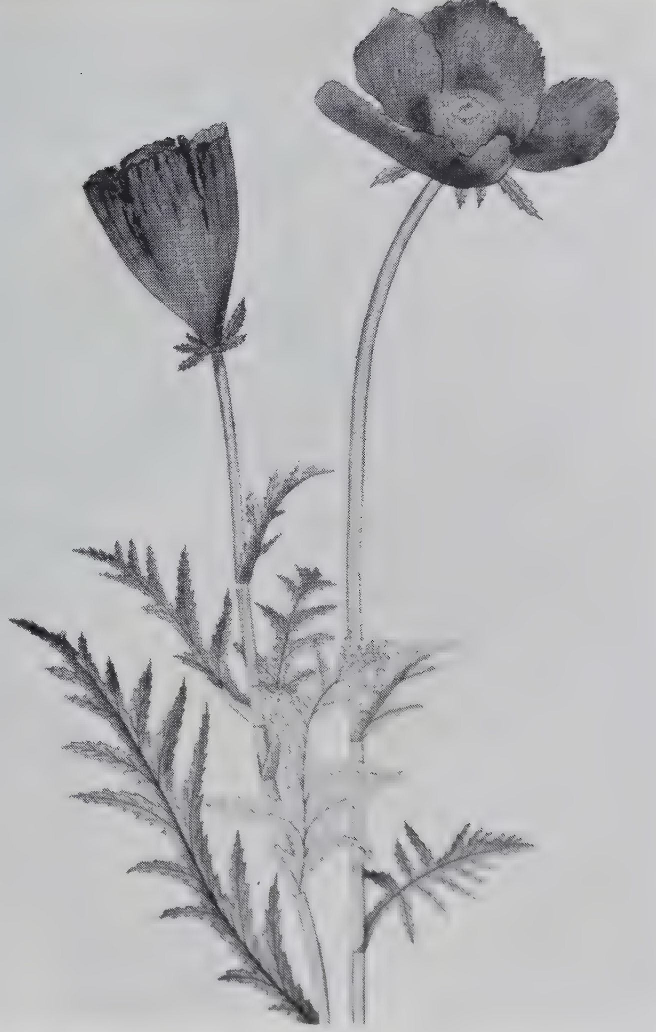

Fig. 50. The One-petalled Poppy (Papaver bracteatum monopetalum) and a Flower of the ordinary Perennial Poppy.

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ROCK GARDENS, NATURAL AND ARTIFICIAL.

By R. Lloyd Praeger, B.E., B.A., M.R.I.A.

(Substance of a lecture delivered March 22, 1909).

Of late years the cultivation of alpines and rock-plants has been increasing in favour, so that now a piece of rock-work devoted to these inhabitants of the hills is almost a necessity in any garden where an attempt is made to minister to the needs of the various classes of plants deemed worthy of cultivation. While the majority of alpines are of the easiest culture, many of them need special treatment, and some few others are the despair of the gardener: no soil or situation seems to please them, and all the wiles of the most experienced grower are lavished on them in vain. I have spoken of alpines *and* rock plants, and it may be asked why these two classes of plants are grouped together. It might be said that the conditions under which they grow are widely different; that the flowers which brave the frost and snow and storms of the elevated regions would differ altogether in their requirements from those which flourish on dry hot rocks in the plains. And this brings us at once to the question as to what are the special features of alpines and rock-plants, and why we award them special treatment in the garden.

If we examine a series of plants whose home is on dry rocks or high mountains, a general similarity of form will be observed, and several peculiar features common to both groups will force themselves on our attention;—their dwarf stature; their tendency to form close cushiony masses; the frequency with which they display a dense covering of hair or felt, or a tendency to succulence; and the size and brilliancy of their short-stemmed flowers. And all these features are explained when we consider the conditions under which they live. Whether on lowland rocks or highland slopes, these plants suffer great exposure to wind, and tall or loose or straggling forms would be broken; but dwarf bushy growths successfully weather the worst storm. Exposure to burning sun, also, is excellently met by a cushiony growth, with the roots well tucked in under a dense mass of stems and leaves. Again, in alpine regions the summer is very short. After the snow has passed away, there is no time for the formation of tall or elaborate stems. Within the space of perhaps three months, the whole cycle of growth—leaf, stem, flower, and fruit—must be performed; and hence our characteristic alpines are close-growing things, with flowers nestling close down to the leaves. Next, guarding against drought is a very important matter for all plants which grow in dry places. Dry winds—whether the scorching winds that blow across Arizona deserts or the icy breezes of alpine regions— are especially dangerous to the proper fulfilment of the functions of leaves and stems, causing as they do an excessive loss of water from the surface of these organs. We find in alpines and rock-plants various devices for hindering undue loss of water. The general reduction of the surface, effected by the close growth and small size of the plants, helps materially. The leaves are often very much reduced as regards area, and their surface is often rolled back upon itself, as in many grasses, heaths, &c. Here also we find the use of the dense covering of hair or felt referred to already, which forms a very effective barrier against the scorching rays of the sun. In the succulent plants we see the most elaborate system of protection against drought. The skin of the leaves and stems forms a very impervious coat, inside which a large reserve of water and food is stored up against periods of drought. In the size and brilliancy of the flowers of alpines we may imagine we see the effort of the plants to advertise themselves during the brief period of their florescence to the comparatively few insects of the mountain solitudes, in order that their blossoms may be properly fertilized, and mature seed result.

When we come to cultivate alpines and rock-plants in our gardens, we should remember the conditions under which they grow in their native homes. First of all, even in the case of those which live on wet rocks, drainage is perfect; and that is the *sine quâ non* of a successful alpine garden—drainage, and always drainage. And not only main drainage, in the way of a general draining of the site, should it need it; but drainage for each plant, in the form of a light porous soil, with ledges and stony pockets. Then we must imitate the sunny and open positions in which they grow in nature, by avoiding overhanging trees or other too dense shade for our plants. The soil should be deep, too, with big blocks of stone, for many of our little alpines have yard-long roots, which they are accustomed to thrust far into the rock crevices, in search of food and moisture.

Natural rock-gardens of course display a wide variety of conditions. In the Alps or on any similar mountain range a whole series of floras is met with, piled one over the other. Above the limit of cultivation the pine forests climb up the slope, giving shade and a rich humus soil for many very delightful flowers. Above this, sub-alpine bushes often again afford protection. Thence we emerge on the great grassy slopes, gay with a hundred beautiful alpine species—Primulas, Gentians, Soldanellas, and many others; while around and above are rocky scarps and precipices, the favoured home of innumerable alpines—Saxifrages, Sempervivums, Androsaces, and so on.

Arctic plants resemble in many ways those of alpine regions, and it used to be thought that these two peculiar floras were closely allied, and had a common origin. It was held that when the Great Ice Age descended on our earth, and the polar ice-caps crept further and further southward, the polar vegetation was pushed southward over the plains before it; then, when the ice at length retreated, some of the plants migrated again towards the Arctic regions, but others climbed instead into the mountains, finding there the conditions of cold and exposure to which they were accustomed. But an analysis of the Arctic and the alpine floras shows that as a matter of fact they have little in common as regards composition. Some few species are found in both regions, but the two floras on the whole differ widely. We must look on the alpine flora as a type developed early in mountain regions, which has since, as mountain ranges have slowly arisen and passed away, migrated here and there, so that while some alpines are strictly limited in their distribution, many others have now a wide and discontinuous range. (The conditions under which Arctic plants exist, and the character of the Arctic flora, were then described).

Let us choose, for close examination, a natural rock-garden which lies much nearer to our own doors than those of the Alps, but is yet much less known, though it presents problems quite as interesting as any of those furnished by the flora of the great mountain chains. As we stand in Connemara in the West of Ireland, and look southward across Galway Bay, we see the hills of Burren, in Co. Clare (fig. 51), rising gaunt and bare. Even at this distance it can be seen that these hills are grey instead of green. This is owing to the fact that soil or other covering is absent and the naked limestone rock lies open to the sky over many square miles. But light vegetable soil has by degrees accumulated in the pockets of the rock, and on the flat-shelves, so that every chink is decked with flowers, and this seeming desert forms valuable grazing land for sheep. The remarkable feature of its flora is the vast profusion in which a number of plants, which are usually alpine in their habitat, here occur right down to sea-level. And stranger still, mixed with these we find some plants of southern origin, which here occur further northward than in any other country in Europe. The lecturer proceeded to describe the district and its flora, and showed a series of lantern slides of these plants growing in their native surroundings.

Returning to the question of the cultivation of alpine plants, the best methods of building rock gardens and of planting, were discussed. The "pocket system" was recommended as combining suitable conditions with ease and cheapness of construction. A series of lantern slides was shown illustrating rock gardens (fig. 52) in various parts of the British Islands, and their good and bad points were commented on.

SOME LESSONS FROM THE OBSERVATION OF ALPINE PLANTS IN THEIR NATIVE MOUNTAINS.

By Mr. A. Clutton-Brock, F.R.H.S.

[Lecture delivered May 18.]

It is possible to take an interest and delight in alpine plants from many different points of view, but no one, I believe, can take so keen an interest and delight in the spectacle of them growing in their native mountains as the gardener who tries to grow them in the very different conditions of his own garden. There is a danger, of course, that he may be too narrowly horticultural, that he may overlook all the wonderful beauty of the pasture flowers, of the claret-coloured Columbines mixed with white Orchises, of the Globe flowers and Campanulas that he knows already well enough how to grow, and that he may not be content until he reaches those high places where are the Androsaces and *Eritrichium nanum* and where he will learn scarcely any secrets that can be applied to the conditions of the ordinary English garden. But if he has a natural pleasure in all beautiful flowers, and if he is not over-eager to learn what cannot be learnt, and if at the same time he knows something, when he goes to Switzerland, of the cultivation of alpine plants in England, then his delight and interest in the beauty all about him will be enormously increased by his practical interest in the question how he can best reproduce some of that beauty in his own garden.

This is the question which, speaking as a gardener to gardeners, I propose to deal with to-day. My object, is—rather vaguely, I fear, and discursively,—to discuss what we can learn about the culture of alpine flowers from seeing them as they grow wild; and I will begin with a few words of warning about the manner in which an inexperienced gardener is likely to be misled if he thinks he can learn everything about alpine gardening in England from visiting the Alps in the flowering time. I believe that some of the worst mistakes in rock gardening, have come from a blind attempt to imitate natural conditions, without considering the inevitable differences between those conditions and any that can be provided in an English garden. I need scarcely say what those differences are; they are only too well known to all who have tried to grow alpines in England. But we must always bear them in mind when we try to draw conclusions from observation of plants growing wild in Switzerland as to what they will need if they are to prosper in England. And the difficulty of the problem is increased by the fact that some plants are far more adaptable than others, and that only experience will tell us which plants are adaptable and which are not. Thus many higher Androsaces and *Eritrichium nanum* and *Gentiana bavarica* are not adaptable at all; and no one can keep them alive for long in England. But *Ranunculus glacialis*, another very high alpine, and one that grows higher than *Gentiana* *bavarica*, is more adaptable than a plant like *Pyrola uniflora*, which I have seen growing freely on the bank of a trench in a Swiss pasture only about 6,000 feet above the sea, so freely that if I had not happened to know something of its habits, I might have been tempted by its beauty to carry it home to a certain, if lingering, death in my rock garden. But, if one is in search of deceptive plants, one need not take a rare one like the *Pyrola*. There is the little *Soldanella alpina*, one of the commonest plants of the Alps. It grows everywhere, and you would think that it would be as easy to cultivate as *Campanula pumila*. Yet everyone knows that it is difficult to flower; and for this reason, that it first starts into growth with the snows melting all round it, and it needs the moisture produced by these to make it form its buds. If it begins to form them in the east winds of an English March they are likely to wither up before they can come out, and the only way to succeed with Soldanellas, at least in a dry Surrey garden, is to surround them in spring with moss that must be kept damp until the flowering time is over. Or take, again, the case of *Gentiana verna*, a plant even commoner, which grows in pastures, in the fissures of rocks, and even in the glades of pinewoods. You might suppose from its abundance in all positions that it would grow anyhow in your rock garden. In which case your plants would probably be dead within a couple of months of planting. For *Gentiana verna* is not an easy plant to grow, at least in a hot Surrey garden, for two very good reasons. The first is that, like *Pyrola uniflora*, it dislikes disturbance and is slow to make new roots when once it has been disturbed. Where it grows wild, it is, of course, never disturbed from the time when the seeds first germinate. But since it is difficult to raise from seed, most gardeners plant it in early spring; and then, being thus weakened by disturbance, it has to endure other conditions quite different from those which make it thrive in Switzerland. There when first it starts into growth and all during the flowering time it gets continued moisture from melting snows. In England it may experience droughts and east winds all through March and April; the consequence is that it makes no growth before the hot weather and dies in the first heat of June. In Switzerland one often finds it growing where it must be bone dry in late summer. But then it has got vigour enough in the earlier part of the year to endure any amount of later drought. In England it will not endure any drought until it is well established, which will often take a couple of years; and even then it will not make the same growth in our springs as among the melting snows of its native country. Thus in England it must be always protected against drought, and it is fatal to treat it as an ordinary rock plant. It needs a flat place low down in the rock garden that will catch all the rain that falls, and it needs watering in any hot dry weather.

There are many other plants, such as the rock Primulas, *Anemone alpina* and *Anemone sulphurea* and the Alpenroses, which one finds growing in very dry places, but which will not endure the same drought in England. On a slope above Fionnay I walked for over an hour among *Anemone sulphurea* growing as thick as buttercups, and with flowers larger than the largest of *Anemone japonica*. It was mixed at first with *Myosotis alpestris* and higher up with *Gentiana verna* and *Gentiana acaulis*. Already where the Anemones were finest and most abundant the ground was quite dry, for the season was the end of June; and by August in a hot summer it will be as dry as a Surrey heath. Yet there were scarcely any rocks, and the moral is that these Anemones, having grown there from seed, could endure any amount of drought in the summer because they had been well-watered in the spring. From this I infer—and I think experience bears me out—that our first care should be to encourage vigorous growth in the more difficult alpines by careful watering in the spring. Until they are thoroughly established they must of course have care at all times. But when they are established and have grown well in the spring, they will endure a good deal of drought in the later part of the year.

It is in winter and spring that our climate differs most from the climate of the Alps; and whatever we do we cannot altogether overcome the difference. We must therefore always bear it in mind when we try to learn anything about the culture of alpine plants in England from observing them wild in Switzerland. In particular we must not suppose that a plant which thrives without rocks in Switzerland will do so in England, or that natural arrangements of rock will always serve as a model for rock work in our gardens.

In the higher valleys of the Alps you will often find the whole ground carpeted with alpine flowers, as if they were daisies and buttercups in an English meadow and with scarcely a rock among them. You will find *Gentiana verna* and *Silene acaulis* making a flowery turf together; with *Viola calcarata*, *Androsace obtusifolia*, *Primula farinosa*, *Hutchinsia alpina*, *Ranunculus pyrenaeus*, and *Pinguicula vulgaris* and *alpina*. It is sights such as this that tempt one to wild dreams of making the same kind of flowery turf in England. But it cannot be done; at least not in Surrey. With us *Silene acaulis* will not grow in the same spot as *Primula farinosa*, nor will *Androsace obtusifolia* flourish with the Pinguiculas. These high valleys suit all kinds of Alpine flowers, except the highest and most difficult, because they are frozen hard and covered with snow all the winter, while they are moist with melting snows almost until the snows fall again. Thus the plants in them need no rocks to protect them either from stagnant moisture in the dead months of the year or from drought when they are growing; and the conditions suit them all alike, whether they cannot endure stagnant moisture in winter or drought in summer. But we cannot give them such conditions; and the best we can do is to learn the peculiar weakness of each plant and make what provision we can for them. We cannot make a flowery turf of all these alpine plants in a valley without rocks; because in such a place we cannot have freedom both from stagnant moisture in winter and from drought in summer. We must therefore plan our alpine gardens with a great variety of aspects and with carefully built rockwork, so that we may suit the needs of each particular plant.

There is nothing in the Alps so likely to mislead an inexperienced enthusiast as the arrangement, or want of arrangement, of the rocks. Some of the ugliest and most desolate rock gardens in this country are attempts to imitate the savage chaos of alpine boulders, which is supposed to be favourable to plant life, because some difficult alpines are to be found growing in it at an elevation of 9,000 feet. Now we in our gardens

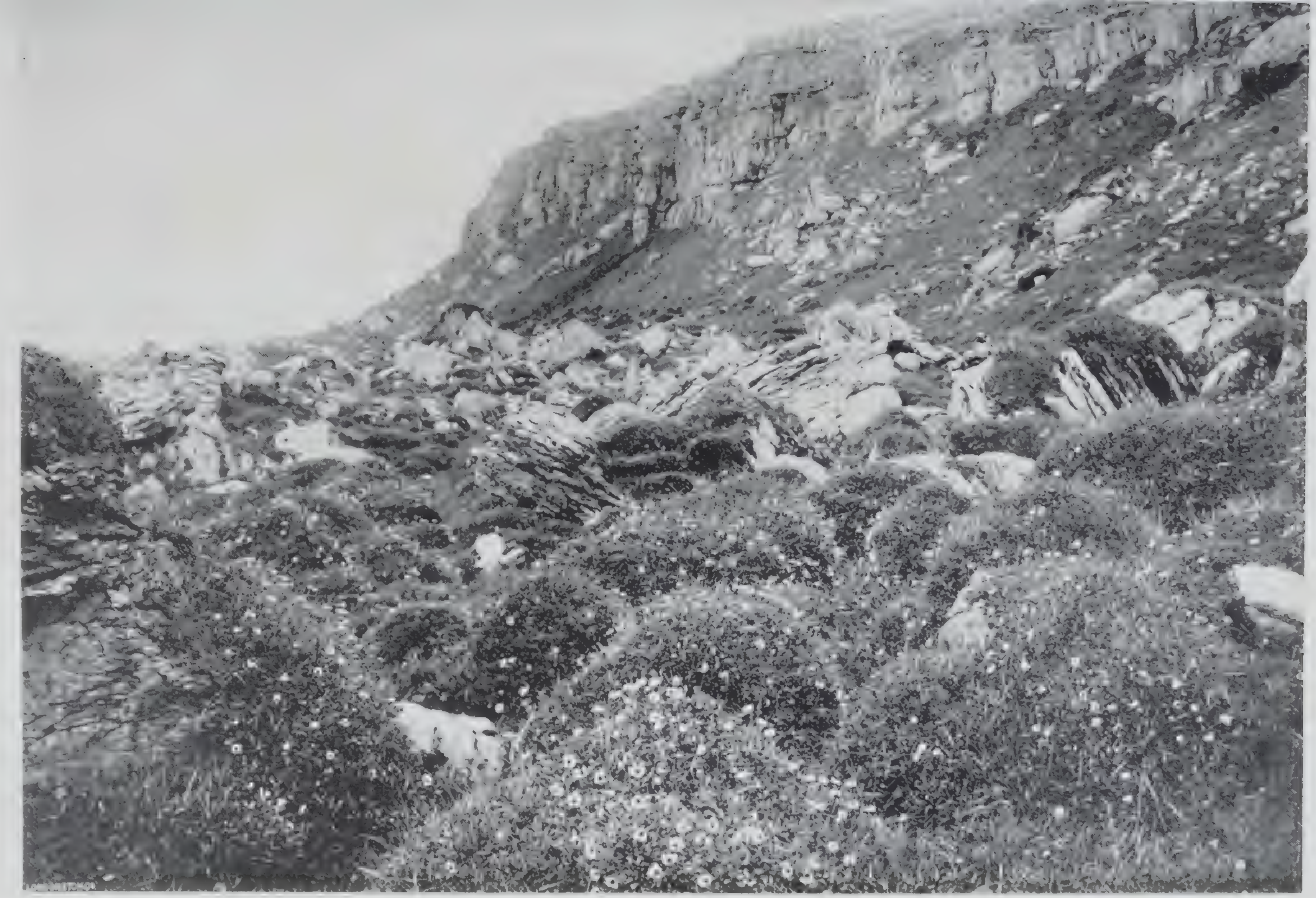

Fig. 51.—The Mountain Avens (Dryas octopetala) in the Natural Rock-gardens of the Burren, co. Clare.

(*To face page* 168.)

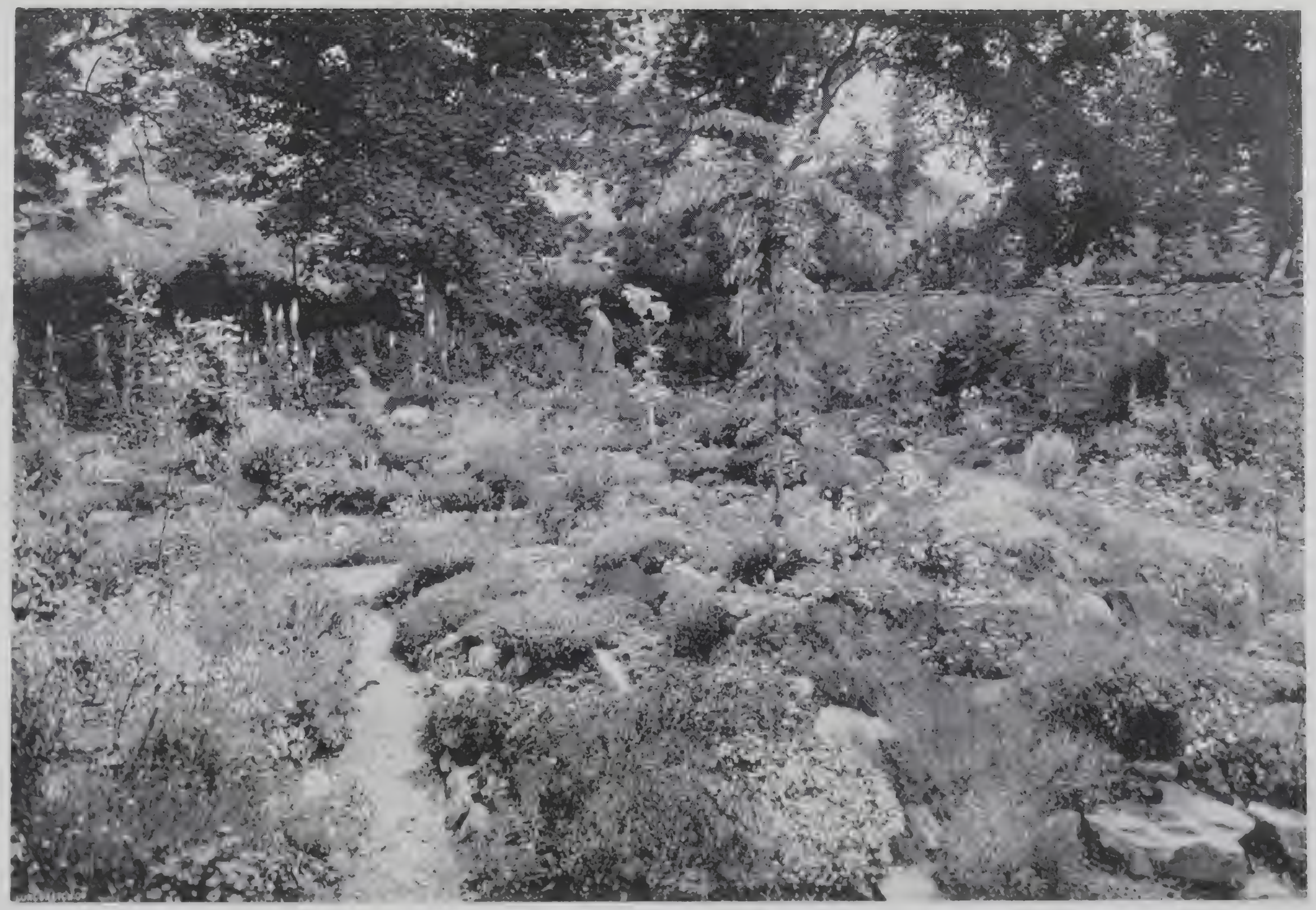

Fig. 52.—A Rock-garden constructed with a minimum of trouble and expense. Paths sunk 1 foot below the general surface, and the earth thrown up into mounds. Stones arranged on the "Step" system.

(*To face page* 169.)

can provide an absurd and insignificant imitation of the chaos, but we cannot provide the elevation with the pure mountain air, the sustained winter frost and the constant summer moisture implied by it. If we strew our little boulders about at random on some dry slope of our gardens, a few stone-crops or seedling wall-flowers will perhaps flourish among them; but most other plants will seize the first opportunity of dying; and an imitation chaos in an English garden bare of vegetation is scarcely less ugly than a rubbish heap. It is useless to study the rock-work of Nature, unless you know what functions rocks ought to perform in your garden. But if you know this, you can get many valuable hints from the Alps, both horticultural and aesthetic. The first of these is that all rocks shall be placed so that the roots of plants near them will be able to run under them and so get protection from drought in summer and from cold and damp in winter. I mention this elementary point because I have often seen in ambitious rock gardens the rocks driven perpendicularly down into the earth, in which position they are of no more use than on a wall. You will notice in the Alps that the finest specimens of alpine plants are to be found often in conditions not otherwise favourable, but at the edge of a great boulder which slants into the ground, so that their roots can run under it and get coolness and shelter as far as they are likely to penetrate; and it is in the slanting fissures of huge rocks that many of the more difficult plants grow best and most abundantly. Therefore never place a rock without thinking of the plant that is to profit by it; never consider rocks apart from roots, for the function of rocks in a rock garden is to protect roots and not to look rugged or picturesque. The next point of importance is to have your rocks as large as possible, so that they may sink a good distance into the soil and give continuous protection to deep rooting plants. We cannot, of course, have the giant boulders of the Alps; but it is where they root under these great boulders that alpine plants flourish best; and even those which flourish without rocks at all in their native mountains may need their protection in a hot Surrey garden. *Silene acaulis*, as I have said, is often a pasture plant in the high valleys; but in Surrey if you are to give it as much sunshine as is needed to make it flower well, you should protect it from drought by planting it where its roots can run under a large rock. It is the same with so easy a plant as *Dryas octopetala* which grows everywhere in the Alps. I have seen the bottom of a valley carpeted with it, beautifully mixed with *Gentiana verna*. It also needs plenty of sun if it is to flower freely, but in hot gardens it will suffer from drought in a sunny place, unless its deep roots can run under a stone. So it is with *Polygala Chamaebuxus*, another very common plant in the Alps. Even there it varies much in quality, and the most beautiful plants, both in habit and in colour, are not those which grow straggling and wiry in the glades of a pine-wood, but the short tufts mixed, perhaps, with the brilliant *Viola calcarata* on a rocky and grassy slope. We should try to grow it thus, taking care to water it well until it is established and keeping the stalks short by layering them in stony soil. These are all plants that thrive best among rocks in England, and so is the beautiful *Daphne Cneorum* of the Southern Alps, which always grows thickest and flowers best when it is continuously layered and not allowed to grow leggy.

Layering as applied to these mountain shrubs is not a purely artificial process. They are constantly, at least when they thrive best, being subjected to the same kind of treatment by nature, for in spring the melting snows carry earth and grit and stones down on to them; and there are some, such as *Daphne Blagayana,* which soon perish in our gardens unless we imitate this deposit with top-dressing. Top-dressing is, indeed, one of the chief secrets in the culture of alpine plants, and there are some of them, such as most of the Primulas and *Aster alpinus* which grow out of the soil if they do not get it. No doubt they have this habit because they are used to the natural top dressing of their own mountain snows. They expect an annual deposit and rise up so that they may not be buried under it. But many other plants need this kind of enrichment to encourage them to make new growth in spring, and in the Alps where the snows have just melted you can often see them half buried under the rich gritty soil that has been carried down in the snow.

I am convinced both from experience in England and from observation in Switzerland, that we do not, as a rule, have rich enough soil in our rock gardens. There are some difficult plants, of course, which will only live in a soil mostly composed of stones and grit; but these are the exception; and even these prefer what little soil they want to contain a good deal of humus. But the great mass of alpine plants thrive in a soil as rich as it can be made with decayed vegetable matter. Some are even the better for a deep layer of well decayed manure from a spent hot bed. Those which need but little soil and thrive in a narrow fissure between rocks, yet like that soil to be good and deep, and all alpines like it to be continually enriched with top dressing. Speaking very generally, I may say that the soil of the Alps is usually a thick mass of decayed and decaying vegetable matter, more or less mixed with grit and utterly unlike the hot sandy stuff which many people think good enough for a rock garden. This vegetable enrichment usually goes very deep; and we need to give alpines in captivity every encouragement to root deeply. Therefore we should give them two or three feet at least of good soil and if this is enriched with yearly top dressings we shall not need to be always shifting our plants about. There are a few that make a rank growth in a rich soil, which rots away in the alternate rains and frosts of our winters, but these are usually rock plants from hotter climates than the Alps, plants like the Onosmas and Aethionemas; and special provision can be made for them. Most alpines get through the winter best when they have made vigorous growth in the summer, and the best protection against winter rot is not to grow them poorly, but to give them good drainage and a sunny open position free from any kind of drip. You must not suppose that because a plant will thrive under the drip of an overhanging rock in Switzerland it will do the same in England. I have seen *Ranunculus glacialis* growing fast and strong in the most drippy places; but we must remember that 9,000 feet up there is no drip in such places in the winter when all moisture is frozen hard. Drip only comes with the sudden spring, and then the plants do not mind it.

But perhaps the most obvious lesson one can learn from alpine flowers growing wild is that they thrive best when they grow close together. I am not speaking of the highest and most difficult plants, such as the

Androsaces or *Eritrichium nanum*; we can learn little about them except that they require conditions which we cannot possibly give them in England. Until some one discovers some new process of acclimatizing plants, we shall never make them thrive in our gardens. I am speaking of the innumerable plants that can be made to thrive, which grow sometimes in rocky fissures sometimes interwoven in a beautiful carpet in the short turf of the higher valleys, sometimes more sparesly in great banks of shale, sometimes among shrubs or in the glades of pine and larch-woods. But wherever they are, there is no bare earth round them, and the soil in which they grow is swarming, as a rule, with intertwined roots. Therefore our object, both for horticultural and aesthetic reasons, should be to have no bare spaces round them in our gardens; a rock garden should show nothing but rocks and plants. I am aware that there are considerable difficulties in doing this, especially at first starting. Plants must have room to grow, and it is just when they are likely to suffer most from bare spaces—that is to say, before they are well established—that there are likely to be bare spaces round them. We can protect them against some of the evils of bare spaces by surrounding them with chips of stone which will keep the soil moist and open. But our ideal should be to have the ground all covered with plants, which are more beautiful than chips of stone, and we should aim at this ideal from the first, both by providing rich soil in which the plants will grow quickly and by arranging them so that they may be good neighbours.

It is this kind of arrangement that needs knowledge and experience to enforce and regulate any observations we may make in the Alps. For we must always remember, before we attempt to imitate the profusion and the happiest combinations of nature, that in a garden our aim is to eliminate the struggle for life which prevails everywhere in nature. Among the Alps you will see *Gentiana verna* struggling through the rampant trailers of *Dryas octopetala*. Nothing could be more beautiful, but you will be unwise to subject your Gentians to the same struggle in your garden, for they will certainly succumb to it sooner or later. Nor can you be sure, when you see plants in the Alps growing discreetly together, that they will be as good neighbours in England. For some alpine plants change their growth altogether in the lowlands and some do not. Alpine poppies and alpine toadflax are the tiniest things high up in the mountains, with flowers disproportionately large and amazingly bright. Grow them in rich soil in a lowland rock garden and they will be five times the size, losing altogether their alpine proportions of flower to leaf and some of their alpine brightness. You must therefore know the habit of plants in an English rock garden as well as their habits in the Alps if you are to combine them safely together. But if you have this knowledge you can get an infinite number of suggestions for beautiful and safe combinations from any alpine Paradise of flowers. You will see *Dryas octopetala* interwoven with *Globularia cordifolia*, an exquisite contrast of lavender and cream; and the *Globularia* is vigorous enough anywhere to hold its own against the *Dryas*. Then if you have a large enough rock garden with cool northern slopes you can plant *Anemone sulphurea* with *Myosotis alpestris*, though neither will be as rich in colour as in the Alps. *Silene acaulis* will contrast well with *Hutchinsia alpina*, both liking a fairly cool place, but the *Silene* must be well grown if it is not to be crowded out by the *Hutchinsia* at the start. One of the most beautiful and commonest combinations in the Alps is of *Campanula barbata* and St. Bruno's lily. This needs a large rock garden if the plants are to be combined in any quantity, and they should be planted close together, as they do not spread. Both can be easily raised from seed, and both thrive in the same fairly cool and undrained positions.

Then there is a wonderful mixture I have seen of *Anemone alpina* and *Aquilegia alpina*, a combination I despair of accomplishing, because, for some mysterious reason, the alpine columbine, which surpasses all others in beauty, deteriorates quickly in captivity, even when you can get it true. I have found it in abundance above Champery growing in the rocks of a northern slope with the alpine anemone, but nurserymen never seem to have the true plant, and if you buy seed under that name it is pretty sure to turn out some variety of *Aquilegia vulgaris.* Yet the two species are quite distinct, and no one could ever for a moment mistake the alpine columbine for any other. The Swiss themselves prize it more than most of their flowers, and sometimes they cultivate it about the higher châlets. It is not a plant of very high altitudes, and ought to be easy enough both to grow and to obtain—at least from seed. But there is some mystery about it which, since it is the most beautiful of all alpine flowers, ought to be solved. I may note also that the only way to succeed with *Anemone alpina* and *A. sulphurea* is to sow fresh seed and to plant out the seedlings as soon as possible. They dislike nothing so much as disturbance, and a full grown plant of either will seldom get over it. Other combinations I may suggest are *Dianthus alpinus* and *Saxifraga caesia*, both of which like lime and a fairly cool place; or *Dianthus alpinus* and *Campanula excisa*, for the alpine pink is a plant of the higher turf and likes its roots to be mixed with the roots of other plants, like so many other alpines. *Campanula excisa* has a bad reputation, but it can be raised easily from seed, and if planted out with little disturbance will send out its little suckers in all directions, mixing up with the Pink but not smothering it. I am convinced, too, that *Gentiana verna* likes to be mixed with other plants; it is usually finest and most abundant in the turf, but many of its usual associates in the Alps will smother it in England, and it should be combined with small plants like *Androsace lactea* or *A. obtusifolia.* As for *Gentiana acaulis*, of which the two best forms I know are our English cultivated Gentianella and the sky-blue variety called 'Caelestina,' it can be combined with *Dryas octopetala* or with *Polygala Chamaebuxus*, if the latter is kept low and given plenty of space. Then we can plant *Silene alpestris* with *Viola calcarata* or with *Campanula pulla*, when the two will intermix their suckers and make a beautiful combination. The alpine poppy goes well with the alpine aster as both thrive in flat stony places, and there the poppy, which is often a biennial or annual in our climate, will seed itself freely.

In the Alps one sees plants growing in masses of one species, and one sees different species interwoven. In our rock gardens, we should aim at the same mixture of massing and combination; and where we have masses or combinations of freely growing plants, we need not have too many rocks. Let there be a large rock for each plant to root under and leave plenty of space between them for the plants to grow in. They will cover the space in a year or so, if only the soil is rich. Again, observation in the Alps will teach us not to make our slopes too steep, for the flowers are usually most abundant in valleys or on gradual slopes. Many people seem to have the idea that a rock garden ought to look rugged and desolate. Therefore they pile rocks together on a steep slope. But the Alps are not all desolation; and we cannot imitate the grandeur of their desolate places even in the largest rock garden. We should aim rather at imitating their flowery abundance, and we can do this best with gradual slopes and shallow valleys, especially if we have a light soil to start with. Where sharp drainage is necessary it can be supplied under the soil with rocks and bricks. That is far better than the drainage of a steep slope from which the rain always runs away. No doubt on heavy soil and in rainy places the pockets in which the more difficult alpines are grown must be sloping; and of alpine gardening in such conditions I cannot speak, for I have no experience of it. These notes are made for those who have light soils and a sunny dry climate like my own. I fear they are rather disconnected and inconclusive; my only excuse is that they are all from my own experience, which is still very incomplete.

THE BRITISH PANSIES.

By Eric Drabble, D.Sc., F.L.S.

[Read April 20, 1909.]

A species may perhaps be best defined for general working purposes as "the unit of classification": that is to say, it consists of an assemblage of plants, incapable of being further subdivided into segregates, which breed "true" and show characters sufficiently constant to enable them to stand as distinct forms.

The pre-Linnean conception of a species seems to have been rather what we now call a "genus"—a group of plants showing many features in common—for example, the clovers—but readily further separated with a little care into truly distinct forms with constant characters. Linnaeus set himself to deal with a heterogeneous and somewhat chaotic material, out of which it was his ambition to evolve some sort of order. Considering the nature of the material upon which he had to work one cannot but wonder and admire at the magnitude and accuracy of his results. That in many instances he grouped two or even several forms together under one name is no cause for surprise—indeed, he himself was quite aware of this fact; what must occasion surprise is that in the vast majority of cases his conclusions have stood the test of time, and this in spite of the careful scrutiny of specialists in the various groups. That Linnaeus did not stay to split some of the more puzzling and critical groups into their ultimate species was due to the fact that he desired to cover the whole Vegetable Kingdom in his researches, and hence he left such groups to the discriminating examination of those of his successors who should devote their attention to small subdivisions of the Plant Kingdom.

Thus it happens that in several cases the "Linnean Species" falls but little short of being a *genus*, including several closely allied species. This is very noticeably the case in *Viola tricolor.*

A great reproach to which systematists have laid themselves open since the time of Linnaeus—particularly his earlier followers—is that they have followed too slavishly in his footsteps and have hesitated to question his conclusions by experiment. This charge, however, must not be brought against all systematists even of the past. Alexis Jordan in 1846 ("Observations sur plusieurs Plantes nouvelles ou critiques de la France," Deuxième Fragment) very cogently states the case for further examination, and says that in his day systematists were very much inclined to assume that the last word on the question of species had been pronounced by Linnaeus. But as for himself, he tells us, he refused to adhere blindly to the old traditions, and as the result of his work we are now in a position in several genera to realize clearly the composite nature of the "Linnean Species." His good work was carried on by Boreau and others, and is now being continued by many workers at home and abroad.

This kind of work has been greeted in some quarters not merely with far less credit than it deserves, but with discouragement and often with unfounded scepticism. The objections have been of two kinds. The first, which is happily now becoming a matter of history only, is founded on a misconception of the true aim of classification, which was, and still is in some quarters, regarded merely as a convenient means of grouping species for purposes of reference. Hence any tampering with the units was looked upon somewhat in the light of an inconvenient and almost unjustifiable interference. This view of course needs but little refutation, for classification is now generally recognized to be an attempt to express natural relationships, and not merely, or even primarily, a matter of convenience. The second objection is far more serious. Doubt is often cast on the scientific accuracy of the observations recorded. Unfortunately this objection is only too often well founded. Nothing is more harmful to the cause of Systematic Botany than the unrestrained practice of making a "new variety" or a "new species" out of a plant which may differ in some point or points from the general and typical form of the plant in question. Scientific research is as urgently necessary in Systematic as in other departments of Botanical Science. It is, however, unfortunate that the earnest and careful student should suffer so greatly from the obloquy deservedly heaped on the mere "species-monger." It is absolutely necessary that the very best available evidence should be sought for the correctness of the conclusions. This evidence must be derived from several sources. The plants must be observed year after year and as far as possible under different conditions. Careful and minute examination of their characters must be made for several generations, and should be extended to plants taken from localities as widely separated as possible. This examination may best be accomplished by cultivating the plants in such a manner that strict control of the conditions is possible. These lines of work are usually sufficient to demonstrate the constancy or otherwise of the form in question.

Valuable evidence may also be obtained by investigating the possibility of the occurrence of natural or artificial hybrids.

Several years ago I was greatly impressed with the apparent multiplicity of forms of wild Pansies met with in this country, and in my attempt to gain some knowledge of the work that had already been done on this group on the Continent I was greatly helped by Mr. E. G. Baker, F.L.S., of the Natural History Museum, who at the time was paying considerable attention to these plants. I gladly take this opportunity of acknowledging his kindness.

At first the prevalent scepticism on these matters possessed me to the full, and up to a certain point the more Pansies I saw the less did it appear that there was anything but a wide range of variation in a single (or at most two or three) species. Looking back on that period I now see that this unbelief was almost entirely due to the manner in which the Pansies in our large herbaria have been named, for there it seems that nearly every collector has had his own ideas of the species, and has paid but little regard to the ideas of the first describers, and, moreover, the lack of care in discriminating form from form has been truly remarkable. In consequence, plants covering almost the entire range of form met with in wild Pansies appear under the same "critical" name. This, for instance, is particularly conspicuous in the case of *Viola agrestis* Jord., for many of the plants so named bear not the slightest resemblance to Jordan's figure (Obs. Pt. 2). So hopeless a mass of confusion was most destructive of any ideas of distinctness in these plants.

Observations in the field were then continued in many parts of England, with the result that the original scepticism, so greatly strengthened by the study of herbarium material, became shaken and finally gave way to a conviction that we have indeed, without the smallest doubt, a considerable number of totally distinct Pansies. This conviction was the result of observations which may be summarized very briefly as follows:

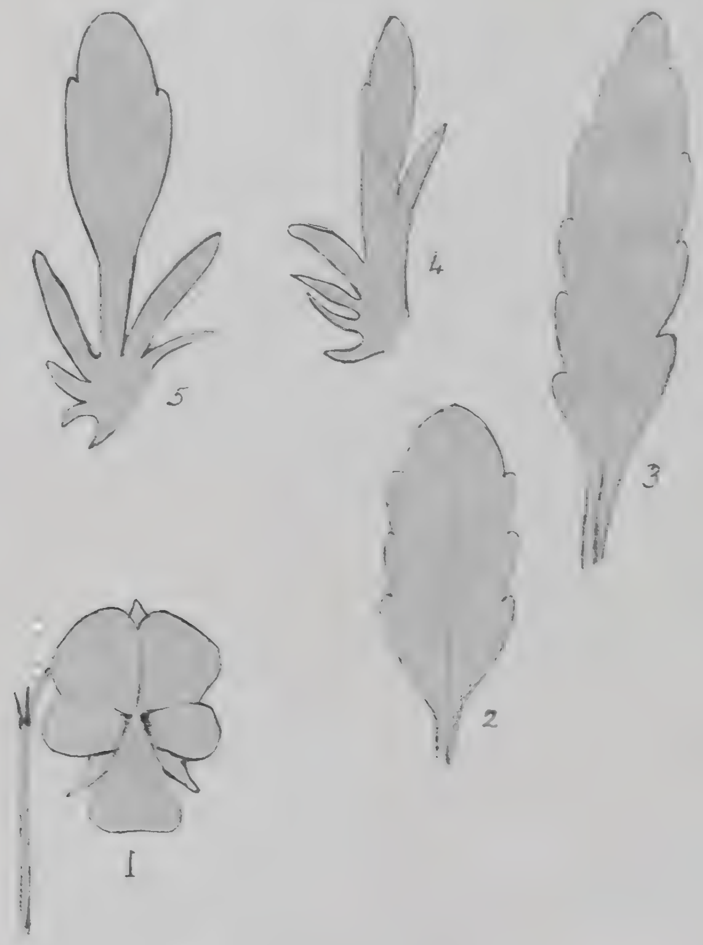

Fig. 53.—Viola Lloydii *Jord.*
1 Flower; 2, a lower leaf; 3, an upper leaf; 4, 5, stipules. (Natural size.)

Under the same conditions and side by side two or more forms may grow, e.g. V. *agrestis* Jord. and V. *Lloydii* Jord., at Norton; V. *polychroma* Kerner and V. *Lloydii* Jord., at Eyam; V. *Lloydii* Jord. and V. *derelicta* Jord., at Linacre; V. *ruralis* Jord. and V. *agrestis* Jord., at Spital. Moreover, the distinguishing characters are constant under very different conditions. For example, V. *ruralis* Jord., a plant of rich soils, when grown in almost pure sand on the sandhills at Wallasey kept its general habit and *in no way* became merged in V. *Curtisii* Forster, the typical

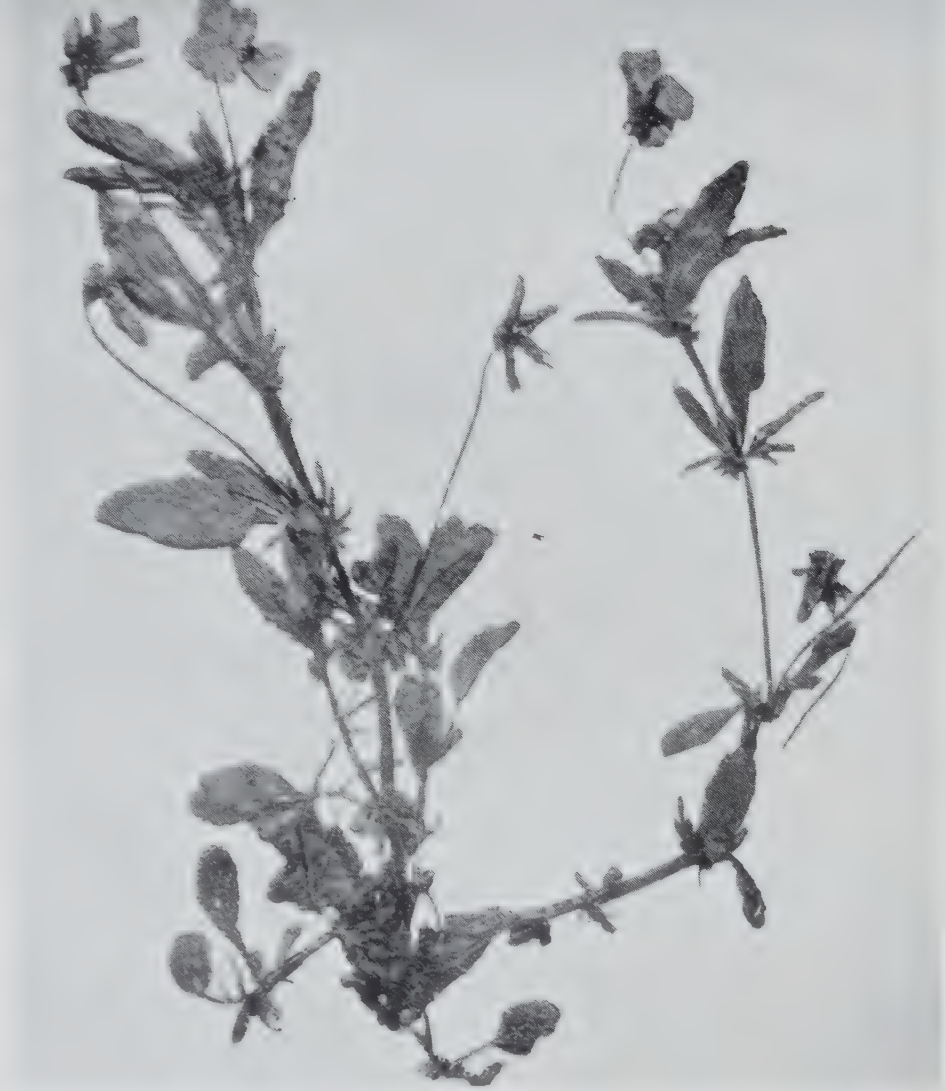

Fig. 54.—Viola Lloydii.
(Half natural size.

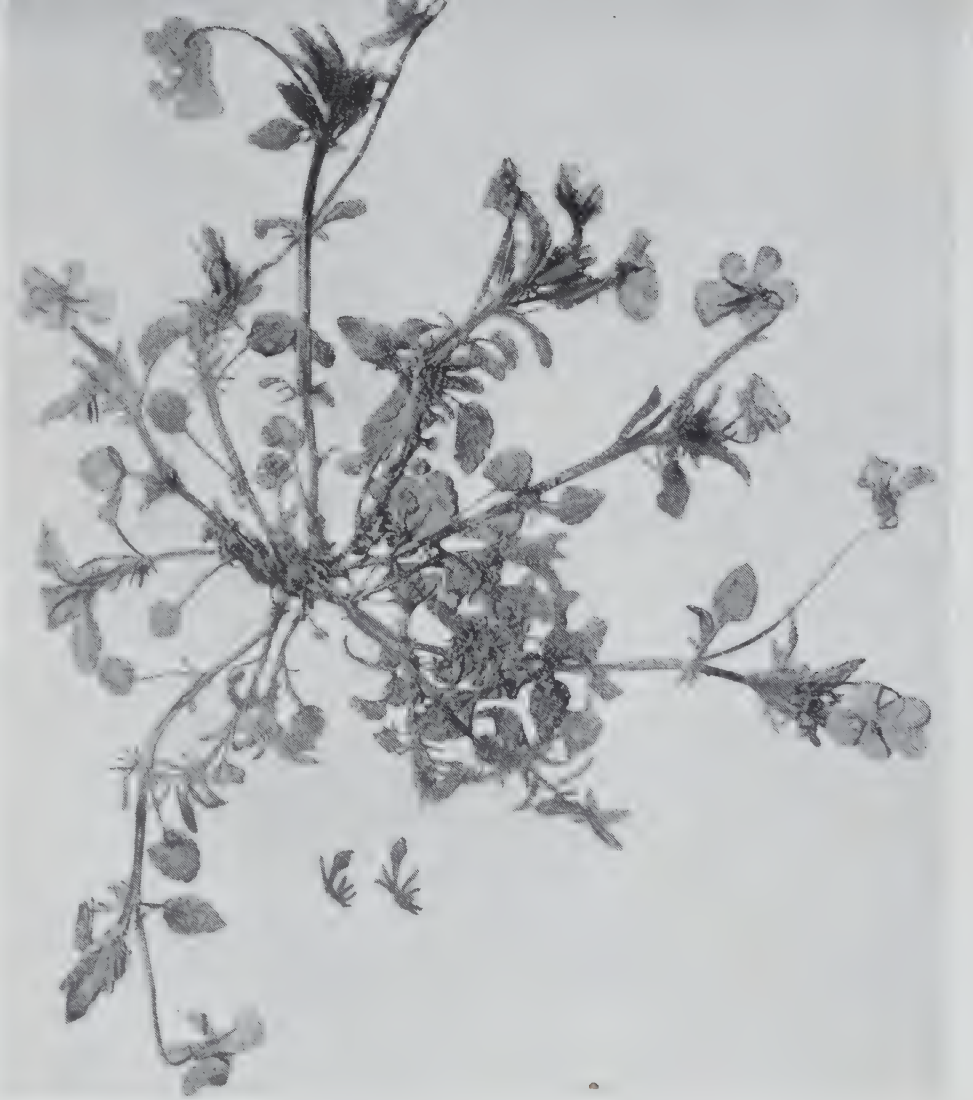

Fig. 55. —Viola variata.
(Half natural size.)

(*To face page* 176)

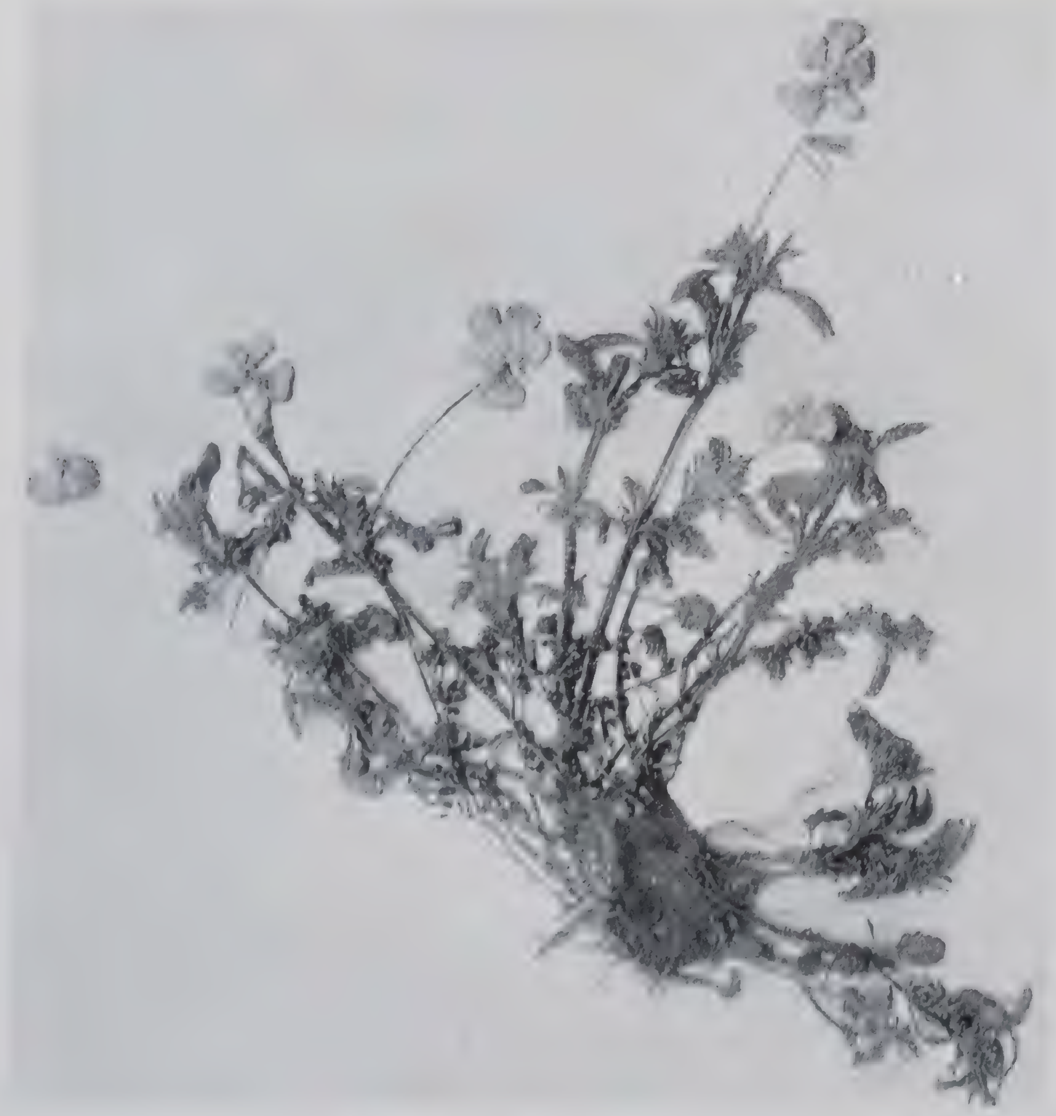

Fig. 56.—Viola cantiana.
(Two-thirds natural size.)

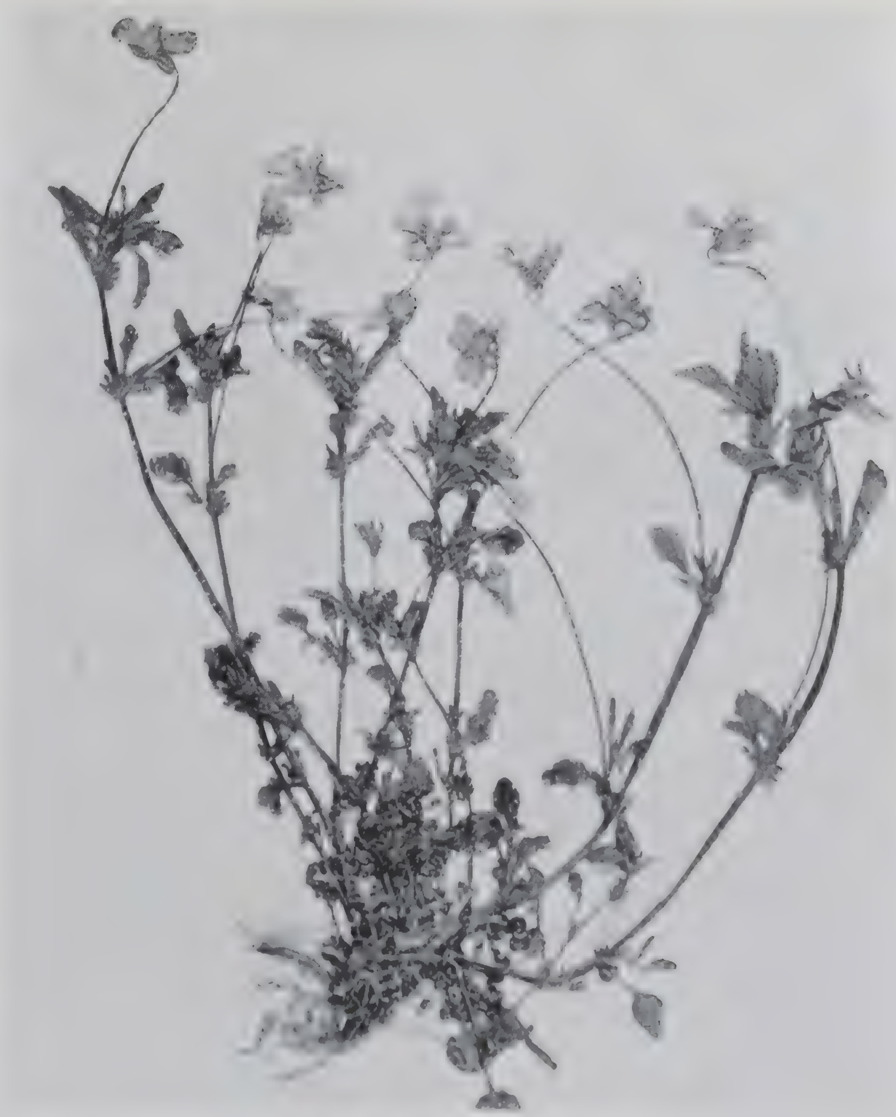

Fig. 57.—Viola alpestris.
(Half natural size.)

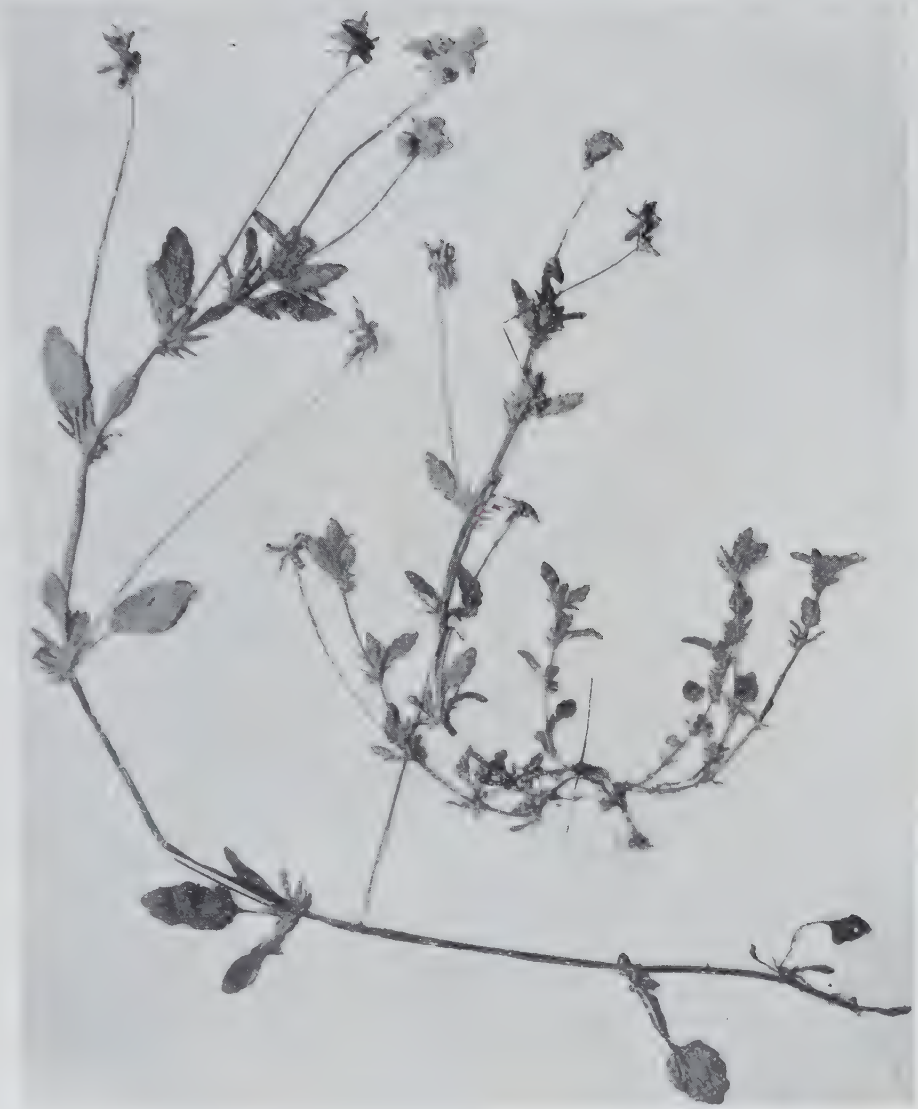

Fig. 58.—Viola lepida (on left), Viola lutea var. multicaulis (on right).
(Two-thirds natural size.)

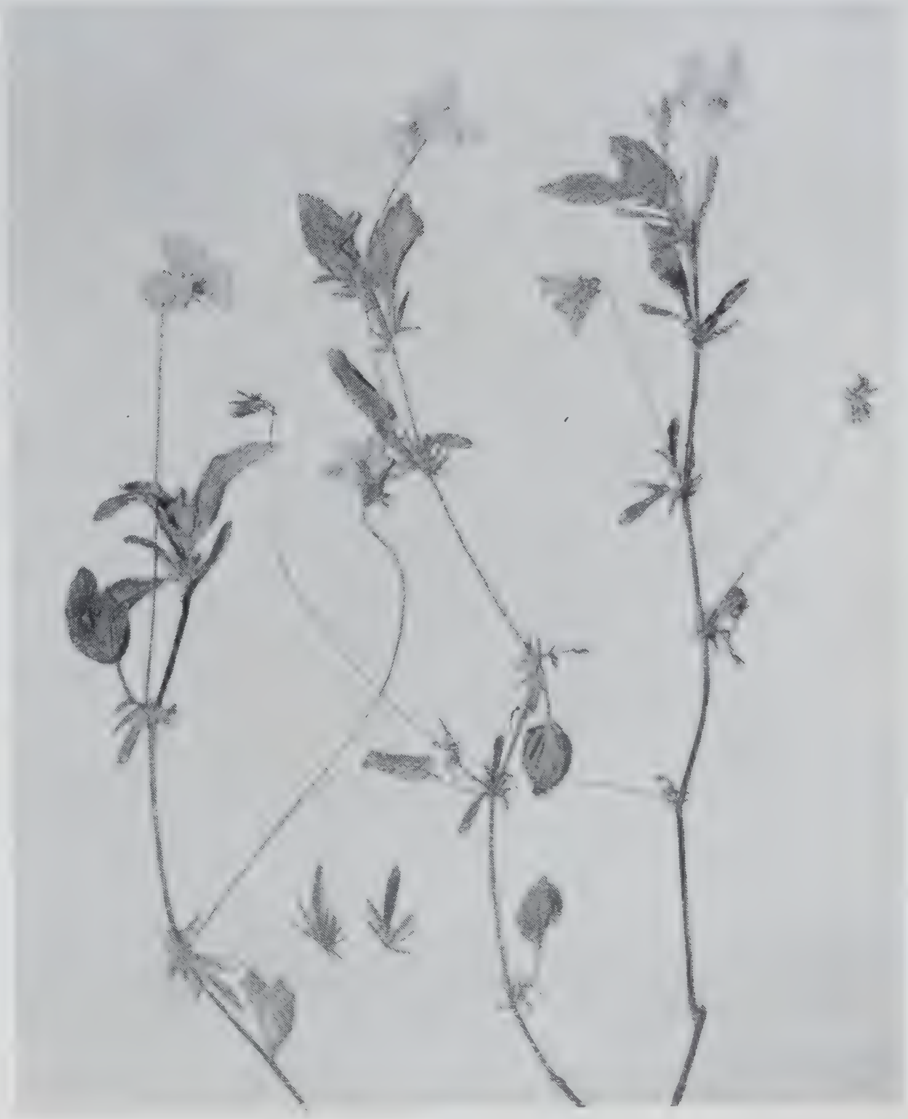

Fig. 59.—Viola polychroma.
(One-third natural size.)

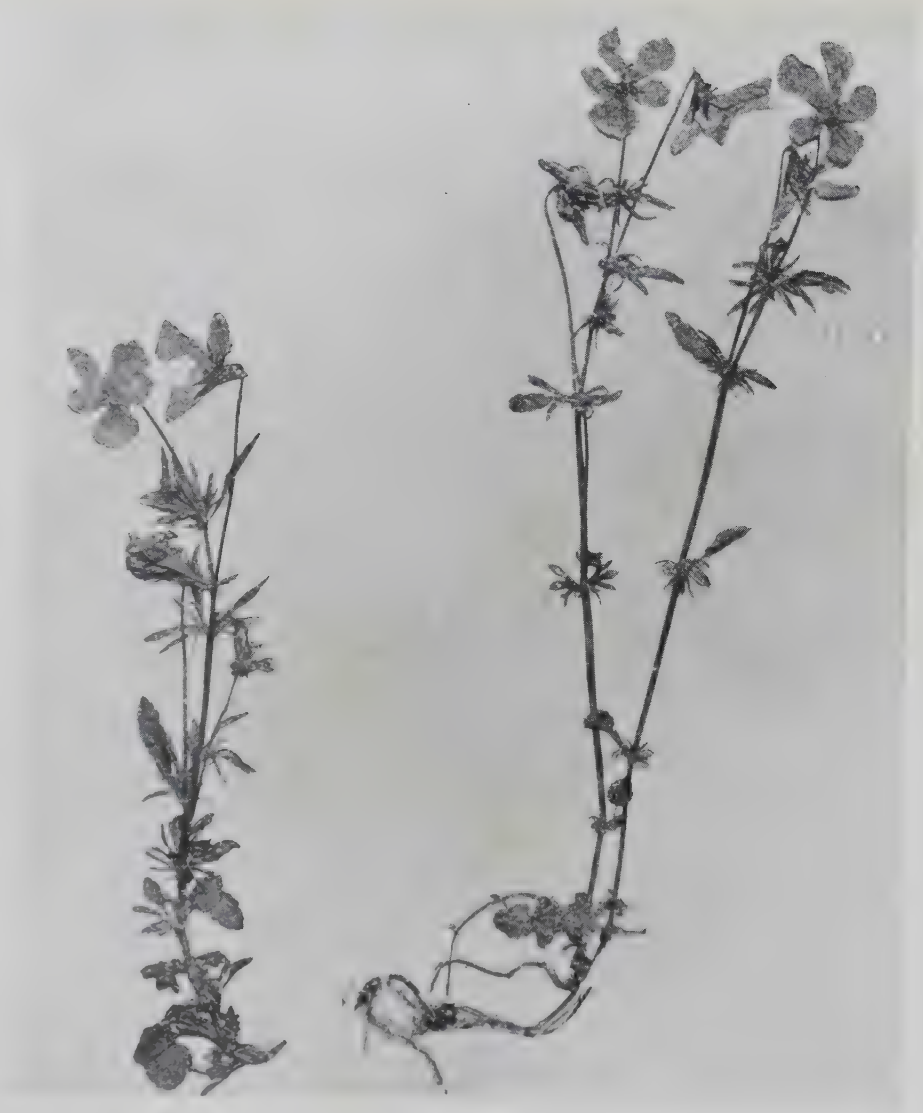

FIG. 60.—VIOLA DECLINATA
(Half natural size.)

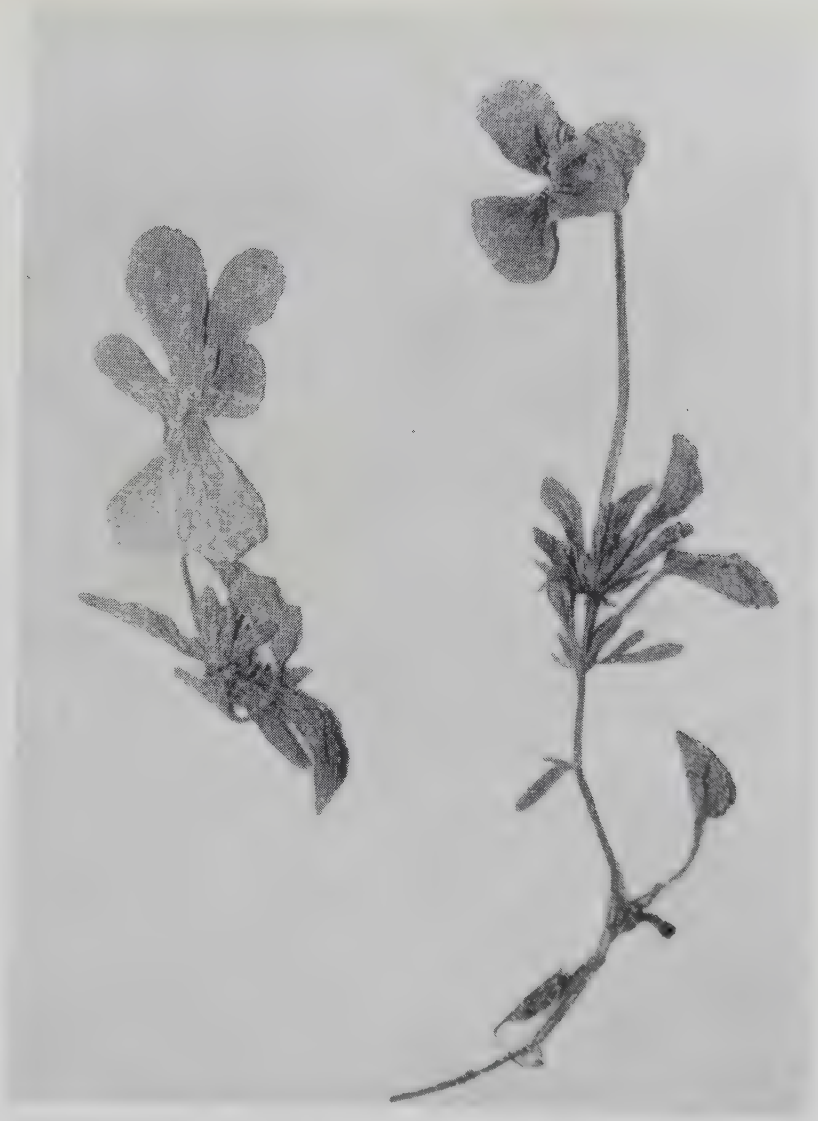

FIG. 61.—VIOLA LUTEA.
(Natural size.)

(*To face page* 177.)

sand-dune Pansy, which formerly I had suspected of being merely a "state" directly induced by its environment.

Further evidence was needed, however. It was necessary to cultivate the plants under observation and control. I am greatly indebted to Mr. W. Hales for his kindness and care in growing several forms from seed supplied to him. Others have been grown in a garden at Chesterfield for a number of generations. The result of the cultivation-experiments is that although the plants may be more luxuriant than in the wild condition, the characters upon which the species are founded remain perfectly constant and unchanged. I think Mr. Claridge Druce, M.A., F.L.S., will allow me to state that he has grown seeds of *Viola obtusifolia* Jord., determined by me, with exactly similar results. Moreover, certain forms believed to be hybrids have been found. They only occur here and there singly or a few together, and only when accompanied by two distinct and well recognized forms. These supposed hybrids are not themselves referable to any of the named forms, and they show characters quite unlike those found in the plants believed to be distinct species. It is impossible to enter here into a discussion of these characters, but they will be described fully elsewhere. The evidence for a hybrid origin is very strong and supports materially the argument for distinctness of the parent forms.

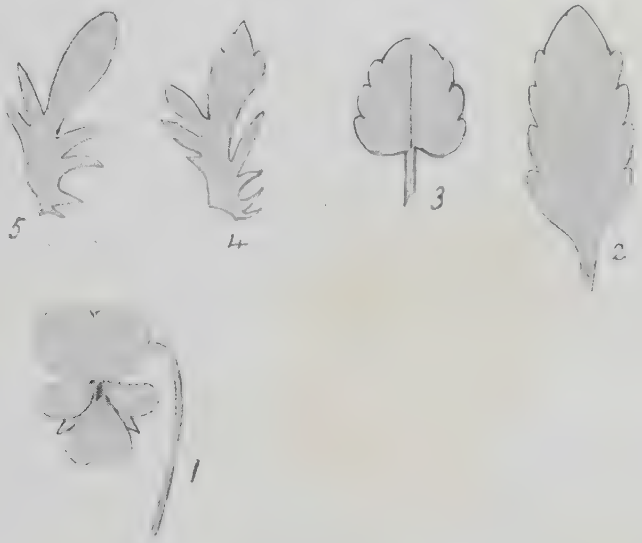

FIG. 62.—VIOLA VARIATA *Jord.*

1, Flower; 2, leaf from middle of stem; 3, leaf from base of stem; 4, stipule; 5, form of stipule often found on upper leaves. (Natural size.)

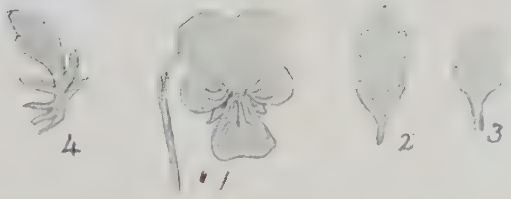

FIG. 63.—V. CANTIANA *Drabble.*

1, Flower; 2, intermediate and upper leaves; 3, lower leaf; 4, stipule. (Natural size.)

What has been the *origin* of the various species, an account of which is now to be given, does not greatly concern us here. They may be mutational in origin, but I do not believe that they are now being formed by frequent and repeated mutation.

Quite apart from the inherent interest of the study of any constituent group of our native Flora, this method of study is of particular value in the case of such plants as the Pansies, when we recollect that our garden Pansies in all probability sprang from hybrids artificially induced between the larger wild species of the North of England. It is the object of the present paper to show what was the raw material upon which the first introducers of the Pansies as garden flowers could work.

The British Pansies may be divided into four main groups.

In the first group are placed the Pansies of the cultivated fields. These are generally annual plants, very leafy and with a large number of flowers. They possess large and usually somewhat pinnately lobed stipules with a mid-lobe showing a general similarity to the leaf. The corolla-spur is short, not surpassing the appendages of the sepals, and is usually rather stout. Many of these plants are small-flowered, with petals but little longer than the sepals (or even much shorter) and the sepals are usually broad. Of these plants may be mentioned *V. agrestis* Jord., *V. ruralis* Jord., *V. derelicta* Jord., *V. segetalis* Jord., and *V. subtilis* Jord. These, on account of their small and unattractive flowers may be neglected in a search for the origin of the cultivated Pansy.

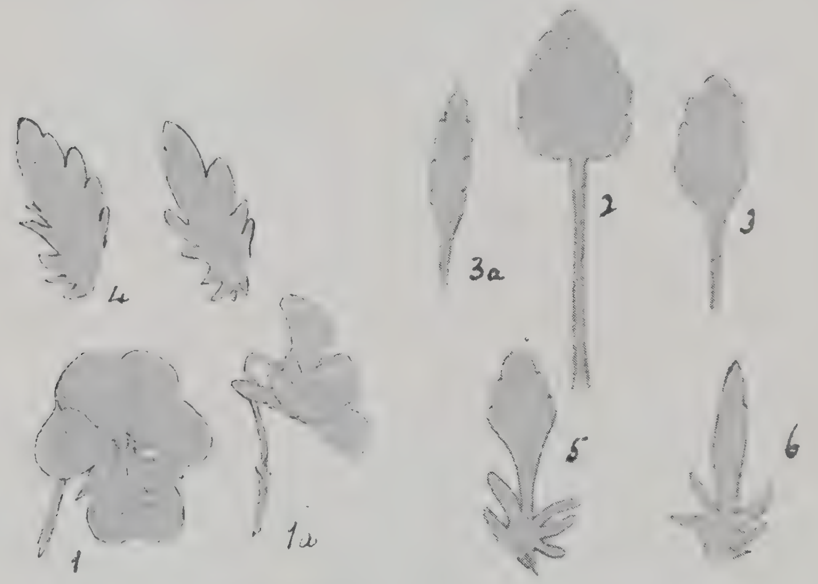

FIG. 64.—VIOLA ALPESTRIS *Jord.*

1 and 1A, Flower; 2, lower leaf; 3, intermediate leaf; 3A, upper leaf; 4, occasional forms of stipule; 5, stipule from intermediate leaf; 6, stipule from upper leaf. (Natural size.)

Others of this class, however, have large and very beautiful flowers. *V. Lloydii* Jord. (figs. 53, 54) is a large plant with blue and white (sometimes yellow) flowers; the upper leaves are long and the stipules have a large, rather slender middle-lobe without much dentation, while the lateral lobes are smaller and more slender, and spring chiefly from near the base of the middle-lobe. This plant is common in many parts of

Great Britain. In *V. variata* Jord. (figs. 55, 62) the flower varies in size, but when large is exceedingly handsome with blue, purple, and yellow coloration, and well worthy of cultivation. The habit is bushy and the leaves are much shorter than in *V. Lloydii*, while the division of the stipule is very different, the mid-lobe being shorter and rounder and less unlike the lateral-lobes, and the stipule as a whole tends to be palmate in form. *V. cantiana* mihi (figs. 56, 63) resembles *V. variata* in habit, but is smaller in all its parts and of a different texture, while the leaves and stipules are covered with very short rather stiff hairs. The figure appears far more like *V. variata* than does the actual plant, the texture and general relative size of the parts affording ready means of distinction. *V. cantiana* appears to be extremely rare in England, and hence perhaps would escape the notice of the early observers. *V. Lloydii* and *V. variata*, however, would offer excellent material for the horticulturist. These plants tend to become at least subperennial, and when crossed with perennial forms would probably produce very useful garden plants.

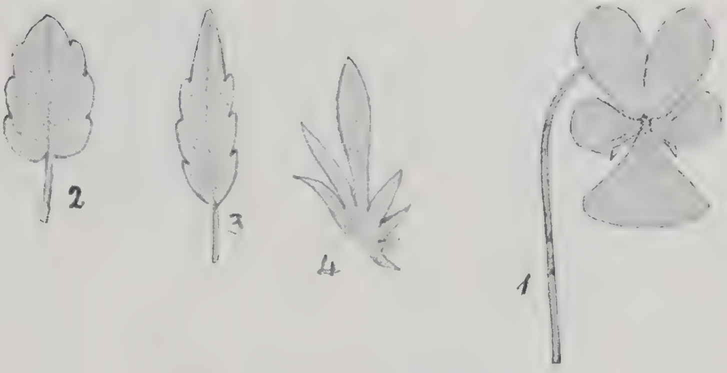

FIG. 65.—VIOLA LEPIDA *JORD.*
1, Flower; 2, leaf from base of stem; 3, leaf from middle of stem; 4, stipule. (Natural size.)

In the second group we find truly perennial Pansies mostly growing in uncultivated places in the uplands. They are characterized by generally possessing slender subterranean stems, the ends of which, or lateral branches from which, or both, may turn upwards and bear foliage leaves and flowers. The mid-lobe of the stipule is usually quite entire and not leaflike, and the stipule as a whole is palmate. The spur of the corolla is longer than in the plants of the last group, and extends beyond the sepaline appendages. The sepals are narrow and shorter than the petals. The British species are described below.

V. alpestris Jord. (figs. 57, 64) approaches *V. variata* very closely and has often been confused with it. It is a bushy plant of similar habit to *variata*, but differs in the longer petaline spur. It seems to form a connecting link between this group and the last. The flowers are yellow and thus differ from the typical form of *V. variata*, but the latter may also possess yellow flowers, and it is such plants that have been confused with *V. alpestris*. *Viola lepida* Jord. (figs. 58, 65) is a plant with several flowering stems arising from the base and bearing particoloured flowers. The mid-lobe of the stipule is entire and not leafy. *Viola polychroma*

Kerner (figs. 59, 66) is our handsomest British Pansy. It grows in large clumps 12–18 inches in height and with many stems arising from the base. The flowers are very large and brilliantly coloured with blue and yellow. The stipules are palmate, with a larger but quite entire mid-lobe. This plant appears to be very rare in England; indeed, I have hitherto only found it in Derbyshire. There can be but little doubt that if found it would be seized upon for horticultural purposes, and, as we shall see presently, it is possible that one of the Pansies figured in "Gerard's Herbal" in 1597 was *polychroma*. *Viola Provostii* Boreau (fig. 67) is a large branching Pansy with long internodes, stipules like those of *polychroma*, very long axillary peduncles and large yellow flowers. Our British plants differ from the Continental ones so named only in having broader leaves, a distinction the constancy of which has not been tested and on *à priori* grounds seems too small and trifling to serve as a distinctive character. *Viola declinata* Waldst. and Kit. is a very striking Pansy (figs. 60, 68), which seems to fall into this group more naturally than into the last. The internodes are long, the leaves are exceedingly narrow, and the whole plant has a slender and graceful appearance. The flowers are large and chiefly blue or purple in colour. The plant is subperennial or perennial. The British Pansies referred to this species differ in one or two important respects from the type, and perhaps should not be placed here.

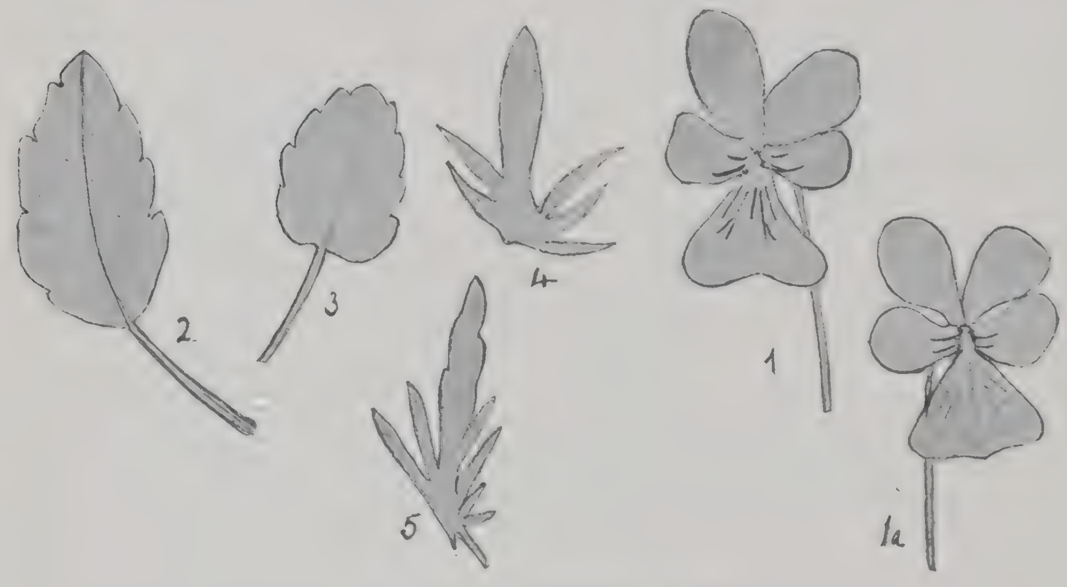

Fig. 66.—Viola polychroma *Kerner.*

1 and 1a, Flower; 2, leaf from middle of stem; 3, leaf from base of stem 4 and 5, stipules. (Natural size.)

Passing now to the third group, we find it to consist of a set of upland Pansies with short and almost unbranched aerial stems, and underground stems of a perennial nature. The leaves are generally small with palmate stipules, and the flowers are large. Of these plants the best known is *V. lutea* Huds. (fig. 61), a plant growing abundantly on the limestone hills of Derbyshire and elsewhere and having one, or at most few, large yellow flowers on each plant. The flower is generally much longer from tip to tip than it is broad. This is known to be one of the plants used in the crosses which first gave rise to the garden Pansies. De Vries, indeed, says:—"The garden Pansies are a hybrid race, won by crossing *V. tricolor* with the large-flowered and bright yellow *V. lutea.* They combine, as everyone knows, in their wide range of varieties, the attributes of the latter with the peculiarities of the former" ("Species and Varieties"). There is a blue-flowered variety of this plant known as var. *amoena* Syme, often found growing with the yellow-flowered plant. The plant known as *V. lutea* var. *multicaulis* (fig. 58) was originally placed here. It has several long stems and the general habit of *V. lepida*, but the flowers are more like those of a small *lutea*, and may be yellow or parti-coloured. It falls most naturally into the last-mentioned group.

The fourth group of Pansies is that known as the *Curtisii* group, and is composed exclusively of plants growing on sandhills by the sea. The habit is generally bushy with long underground stems of similar nature to those possessed by most sand-dune plants. As has been stated above, *V. ruralis* on the sandhills, while adapting itself slightly to the habit of a sand-dwelling plant, does not at all change its other characters in the direction of *V. Curtisii.* As none of these plants have in any probability served as a stock whence the garden Pansies have arisen they will not be considered further here.

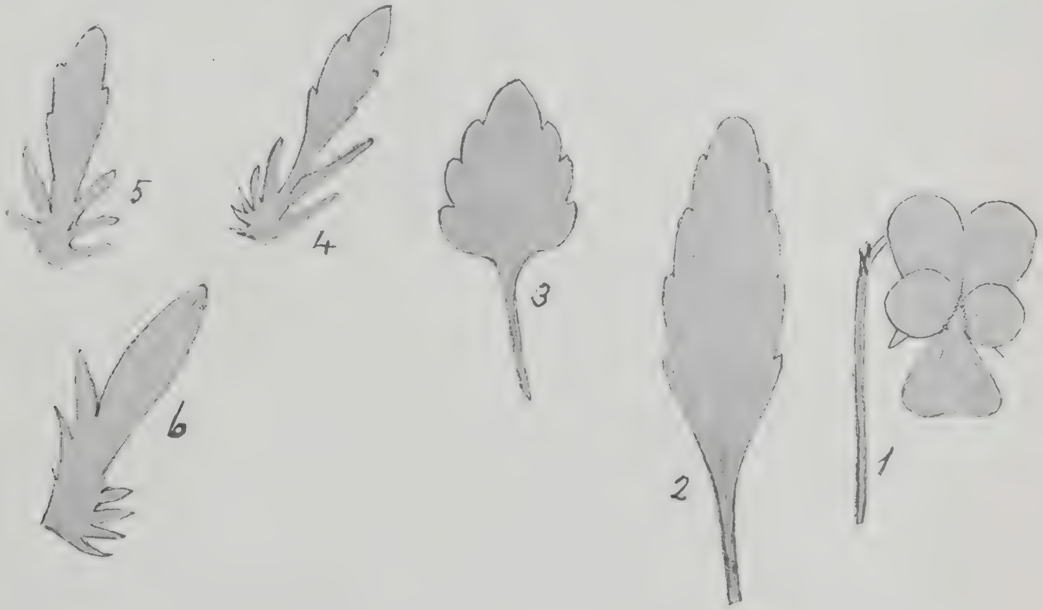

FIG. 67.—VIOLA PROVOSTII *BOREAU.*
1, Flower; 2, leaf from middle of plant; 3, leaf from base of plant; 4, 5, and 6, stipules. (Natural size.)

It is interesting to consider the Pansies described and figured by Gerard in his "Herbal." In the first edition, published in 1597, he refers to a yellow and a tricoloured garden Pansy as quite distinct. He also mentions as wild forms, the Heartsease and the Upright Pansy, the Stony Heartsease and the Wild Pansy. Inspection of the very excellent figures leads to the conclusion that these Pansies may with some degree of certainty be referred as follows: the Heartsease is probably *V. Lloydii*; the Upright Heartsease looks like *V. polychroma*; the Wild Pansy is a degenerate garden escape and the Stony Heartsease probably a small-flowered *V.*

variata. In Johnson's edition of Gerard's "Herbal" (1633) the same enumeration of forms and the same descriptions occur, but they are accompanied by different figures. They seem to represent the following Pansies: the Heartsease is apparently *V. variata*; the Upright Heartsease is apparently *V. polychroma*; the Wild Pansy is a degenerate garden escape; while the Stony Heartsease appears to be a small-flowered *arvensis* form. Thus it is quite evident that at this early date different forms of wild Pansies were recognized, and, so far as we can judge from the figures, for that time excellent, but not sufficiently critical to render definite identification possible, the following Pansies seem to have been known: *V. Lloydii*, *V. variata*, and (rather doubtfully) *V. polychroma*, all of which would serve as useful plants for crossing with *V. lutea* to produce garden stock.

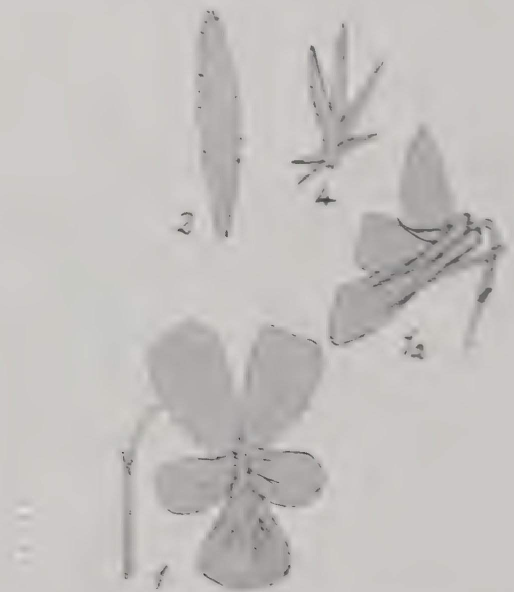

FIG. 68.—VIOLA DECLINATA *WALDST.* AND *KIT.*
1 and 1A, Flower; 2, leaf from middle of stem; 4, stipule. (Natural size.)

In conclusion, it must be emphasized that it is of the utmost importance to understand the differences between these apparently distinct species in case any further hybridizing experiments involving the use of wild pansies should be contemplated. To say that *V. lutea* was crossed with the wild Heartsease Pansy means nothing but confusion. Recent work on hybridizing has shown with the greatest certainty that two closely allied forms may give quite different results when crossed with a third form, and hence we must be perfectly sure of our units if the record of the results of hybridizing is to have any value.

If, then, it be urged that the study of ultimate species is of a hair-splitting and somewhat unworthy kind, the answer even from a merely utilitarian point of view is at once forthcoming: that unless we know our units we can never count on any success in repeating crosses for horticultural purposes. To the botanist the only necessary justification is that, if the investigation be carried out conscientiously, the results must be a real contribution to our knowledge of the Vegetable Kingdom.

SOME OLD SUPERSTITIONS ABOUT TREES AND HERBS.

By Rev. Professor G. HENSLOW, M.A., V.M.H.

[Read June 8, 1909.]

THE TREES OF KNOWLEDGE AND LIFE.—Perhaps the oldest of all superstitions about plants is seen in Tree Worship, which has been almost universal. It most probably arose from veneration for certain trees in each country which supplied the inhabitants with useful products. The tree then came to be the dwelling place of the deity, so that in pictures on the tombs in Egypt, &c., a human being representing the god or goddess is seen amidst the foliage of the tree.*

The sacred trees were called in Babylonia "The Tree of Life" and the "Tree of Knowledge." A Persian "paradise" was an enclosed garden of trees and walks for the delectation of the king. Mrs. J. H. Philpot, in her work *The Sacred Tree*, says: "The sacred books of the Parsis contain a very similar version [to that of Genesis.] The original human pair, Maschia and Maschiâna, sprang from a tree in Heden, a delightful spot where grew hom or haoma, the marvellous tree of life, whose fruit imparted vigour and immortality. The woman, at the instance of Ahriman—the spirit of evil in the guise of a serpent—gave her husband fruit to eat and so led to their ruin."

On a Babylonian cylinder a palm tree stands between two figures preparing to pluck the fruit, while a serpent stands erect behind one of them. If the date-palm was the "Tree of Knowledge" in Babylonia, it would seem that the vine was most probably the "Tree of Life," though the date was latterly apparently also considered as a tree of life. "It was characteristic of the earliest period of Babylonia, and while its fruit seemed to be the stay and support of life, the wine made from dates made 'glad the heart of man.' Date-wine was largely used, not only in Babylonian medicine, but in the religious and magical ceremonies."† Professor Sayce, alluding to the Cedar ‡ as a supposed tree of life, which he now thinks was an error, says:—"It was upon the heart or core of the cedar that the name of Ea, the god of wisdom, was inscribed. It was wisdom rather than life, the knowledge of the secrets of Heaven and the magical arts that benefit or injure, which the priesthood of Babylonia and the gods they worshipped kept jealously guarded. Only the initiated were allowed to taste of its fruit." He here means the soma or wine, the giver of eternal youth and immortality.

The date would thus seem to include characteristics of both the trees mentioned. But as the vine is equally abundant in Babylonia, there is reason to think that this may have stood for the Tree of Life in that country.

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* See the goddess Nutt in a Sycomore Fig Tree in "The Sycomore Fig," *Jour. Royal Hort. Soc.*, vol. xxvii, p. 130.

† Sayce's *Hibbert Lectures*, 1887, p. 241, ff.

‡ The Cedar is not a native of Babylonia.

The vine is often depicted—though in a very conventional form—attached to a date-palm, and this may have perhaps assisted to combine the two.

MAGIC.—Professor Sayce has shown most clearly how magic preceded religion; magical texts belong to an earlier and non-religious period in Babylon. It was thought that any movement was a sign or proof that the object in motion had a spirit, as man himself can move because he is alive. All sicknesses, &c., were supposed to be caused by evil spirits, so that to cure them magic was resorted to; but, as Professor Sayce says, "receipts for the cure of diseases, which scarcely differ from those that would be prescribed to-day, are mingled with charms and spells in later periods. The sick man was given his choice between a scientific treatment and a recourse to the old system of the primitive medicine man." * Hymns to deities were associated with spells. So was it in the Middle Ages, spells were often remnants of prayers in the fourteenth century in England.

"It was the existence of disease which first called exorcists into being. The prevention and cure of disease is the main object of the magical texts and incantations. Disease was looked upon as possession by a malevolent spirit." So is it to this day in the uncivilized world.

But one need only go back to Anglo-Saxon days from the ninth to the eleventh century to find the same superstitions still existing. "Scientific medicine was being clouded over by the mystical philosophy and magic of the Orientals, &c. The sound methods of treatment were being superseded by charms and incantations with misapplied religious rites." † Thus history repeated itself.

In the sacred books of Babylon, we find prayers to the Sun-god with requests to remove "whatever worketh evil in the body." Professor Sayce observes that it is a "strange mixture of spiritual thought and the arts of the sorcerer. . . . The hymns to the Sun-god were not yet emancipated from the magical beliefs and ceremonies in which they had their origin. . . . They must have been used by a class of priests known as 'Chanters' or 'Enchanters.' . . . In many we have an alternating antiphonal service, portions of them being recited by the priest, the other portions by the worshipper." ‡

Coming down to much later days charms appear to have acquired a new use in themselves, and not as prayers, for the words "charms" and "incantations," derived from the Latin *carmen* a "song" and *cantare* to "sing," imply their original meaning as soothing lullabies; but they often degenerated into a long string of Latin words without any coherent sense. These being "droned" over the patient in a subdued voice would have much the same effect as a soporific discourse. But this may have been only a superadded use. The real and original object was to expel the evil spirit which caused the disease.

Now, in the preceding, plants formed an important element. The following is a good example given by Dr. Payne of the Magic of Henbane. "Dig round the sacred herb Hyoscyamus before sunset with the thumb and the medical (or third) finger, not touching the root, and address it in a solemn invocation—'Sacred herb, I bid thee, I bid thee, to-morrow I summon thee to the house of my patient to stop the rheum of his feet, I conjure thee by the great name of Jaoth, Sabaoth, the God who made the earth solid and the sea to stand still, &c., to be thyself the spirit and power of the earth, thy mother, and dry up the rheum of this man.'" It was dug up with the bone of a dead animal and hung round the neck of the gouty patient.

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* *Hibbert Lectures*, 1887, p. 317.

† *English Medicine in the Anglo-Saxon Times*, by Dr. T. F. Payne, pp. 57 ff.

‡ *The Religions of Ancient Egypt and Babylonia*, p. 417.

A somewhat analogous charm is in a list of recipes of the fourteenth century. "For the Goute-caine" [probably for "Sayne," *i.e.* healing]:—"Take the rote of ache [celery] and writte thereon iii words +ihs+xt+dominus+and as long as he be rith [exactly fixed] on hym aboute his nekke, if he haue gode beleue on God, he salle neuere haue it more in alle his lyue." The idea of "hanging" the magical article received the name "Amulet" from the Arabian physicians; it means "to suspend."

In these mere allusions to God, to Christ and to saints, we seem to see a degradation for the hymns sung to the deity, as the Sun-god, to counteract the evil influence of the disease-causing spirit.

Some of the charms employed in gathering herbs were very quaint in Anglo-Saxon times. Thus we read:—"For much travelling overland, lest a man tire:—Let him take mugwood (*Artemisia vulgaris*) in his hand or put it in his shoe lest he should weary."

A most important thing was to name the patient when procuring the plant. Thus Pliny mentions the nettle as being a cure for ague; but the names of the sick man and his parents must be pronounced when it is pulled up. As a lullaby for the toothache the physician is ordered to "Sing this for toothache after the sun hath gone down [probably as the patient was more likely to sleep then]: 'Caio laio quaque voaque ofer saeloficia sleah mama wyrm.' Then name the man and his father, then say: 'Lilumenne' it acheth beyond everything: when it lieth low it cooleth: when on earth it burneth hottest: finis. Amen."

The words are unmeaning, but are corruptions probably of Latin and Greek originals. "Wyrm" refers to the idea that toothache was due to worms. Thus a recipe of the fourteenth century reads as follows: "For toothache of wurms:—Take hennebane-seede and leke-seed and poudre of encens, lay them on a tyl-ston hot glowying and make a pipe of latoun [metal] . . . and hold his mouth there ouer the ouerende that the eyre may in-to the sore tothe and that wil slen [slay] the wurmes and do away the ache."

Another charm was to repeat the words "*Argidam, margidam, sturgidam, seven* times on a Tuesday or Thursday when the moon was waning." This was because the moon's influence was then slackening.

The spirit of a disease was sometimes threatened by some scriptural name:—Thus for a quartan ague: "Depart from the sick man, Solomon is after thee!" The following is a remedy which Mr. Caudle might have tried, to avoid any distress from his wife's "lectures": "Taste at night fasting a radish; then the chatter cannot harm thee."

SIMILARS AND SIGNATURES, SYMPATHIES AND ANTIPATHIES.—These represent medical doctrines of long standing, and applied to inanimate objects as well as to animals and vegetables. Thus the spear of Achilles was said to cure the wounds it made, the sight of a yellow bird would cure jaundice, and the yellow juice of the Celandine would be equally effective. This wild flower is still to be found in hedges near villages, being probably naturalized and not native. Hippocrates maintained that if Nature, when effecting a cure, showed certain peculiarities in the process, the physician should assist by means of drugs which brought on similar symptoms. Philosophers took a wider view; thus one "likes" a thing or person because they are "like" what appeals to us. The idea is embodied in proverbs, as "Birds of a feather flock together," "Blood is thicker than water," &c. Hence Lungwort (*Pulmonaria officinalis*) was a remedy for lung-diseases, because of the spotted character of the leaves. Soldiers wounded should drink a decoction of *Polygonum Persicaria*, because of the reddish dark blotch on the leaves, which resembled blood. The leaves of the cyclamen have somewhat the shape of an ear; hence they were prescribed in aural complaints. Viper's Bugloss, was a cure for the bite of a viper because the stem has spots like those on a viper's back.

It was thought by some that diseases might be compared to poisons, which may be driven out by "contraries" or drawn out by "similars." Thus one wrote: "It is well known that if a venomous toad be dried and powdered, and the powder sprinkled on a poisoned wound, it will draw out the poison as a magnet draws iron, and the wound will heal; similarly antimony is a poison, but if treated chemically it will acquire the power of drawing out poisons from the human body."

Correspondences are shown by "signatures." Thus, if a plant has a flower of two colours, it has two virtues; if three, then it has three, &c. (Paracelsus). A decoction of a thistle, because it is spiny, is good for pains in the side. The leaves and kernels of the peach tree are useful, "for we see on the fruit of the peach, if it be pressed by the finger, a hollow place, so also severe wounds leave hollow places behind them."

A curious superstition resided in "Sympathetic ointment." This was made of moss from a skull which had been exposed to the air, oil of roses, linseed oil, and some other things; then if you can procure the weapon with which a man has been wounded having some of his blood upon it, and anoint it with the sympathetic ointment, the wound will heal of itself without pain, even though the patient be twenty miles off. This idea was firmly believed in in the sixteenth century; but in 1592 it was strongly denounced as absurd by the great chemist and physician Andrew Libavius, who wrote: "I was carving a ham and cut my thumb to the bone. I sprinkled the wound with sugar, and bandaged it (without anointing the carving knife), and with that single dressing it healed completely in a short time." Nevertheless the superstition flourished.

ASTROLOGY AND MEDICINE.—It was said of old "No one can be a good physician who is not skilled in Astronomy." It was thought that the planets caused illnesses by exhalations, as the sun by its excessive heat; hence there was no use trying to cure an astral disease while its star was in the ascendant.

"The doctrine that the heavenly bodies, and particularly the signs of the zodiac, exert an influence on the human frame was held throughout the middle ages. In the sixteenth century astrological calendars were compiled to show the proper days and seasons in which alone medicine could be given or venesection performed. Some forbade any medicines to be given when the moon was in the signs of the ram, the bull, or the he-goat, as they are ruminating animals . . . and all medicine would therefore tend to return to the mouth." *

The famous Herbal of Culpeper was published in 1653 and ran through many editions; two, a small and a large, are still issued from the press. It is called "An Astrologo-Physical Discourse of the Vulgar Herbs of this Nation."

He does not always say why plants are under the dominion of the planets, but now and then he does give a reason, which, however, the intelligent reader of to-day will hardly consider sufficient. Thus in dealing with Henbane: "I wonder how astrologers could take on them to make this an herb of Jupiter . . . The herb is, indeed, under the dominion of Saturn; and I will prove it by this argument. All the herbs which delight most to grow in Saturnine places are Saturnine herbs, and the Henbane delights most to grow in Saturnine places . . . Scarce a ditch or a [manure heap] is to be found without it growing by it: *ergo*, it is an herb of Saturn."

I once went into a small herbalist's shop, and, in conversation, asked why it was that so many drugs were put into one receipt; as in the fourteenth century there were upwards of fifty in some cases. The proprietor said there are two reasons; one was to secure the chance of one or two being effective; but also, as to-day, people would not buy it if the prescription has not several put into one mixture!

After all, are the ignorant poor of to-day, who insist on this, more to be pitied than the higher classes who think it is "unlucky" to be married in May? not knowing that this has descended from Rome because the Lemuria, or commemoration of the deceased, was held in that month!

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* *Medical History from the Earliest Times*, by Withington, p. 251.

WATER-PLANTS.

By F. W. Moore, A.L.S., V.M.H.

[Read August 3, 1909.]

"All plants require water." This may seem a trite observation to start with. Everyone will naturally say, "We know that." Nevertheless a suitable supply of water is one of the great difficulties of plant growing, and one which gets far too little attention from careless cultivators. There is no more difficult operation in gardening, nor one which requires more thoughtful skill, than the proper watering of plants. It soon becomes evident that some plants require more water than others ; that what is poison for one set of plants means happiness for another set. Even to the unobservant this becomes obvious in a hilly district. By the dusty road side on the higher levels plants flourish, restricted in growth, harsh in appearance ; even in cracks in dry walls plants grow. On descending to the flats, flats which in winter are occasionally covered with water for a considerable period, vegetation becomes ranker and more varied, and finally pools, ponds, or lakes appear in which plants also flourish.

In my remarks on "Water-plants" I intend to include all plants which will grow in a saturated rooting-medium, and not merely plants which grow in water partially or completely submerged, thus including what are generally known as bog plants. The term "bog plants" is not a very happy one, as it does not discriminate between peat and mud. In Ireland it is generally applied to peaty swamps in which vegetation is sparse and rather limited, whereas in mud bogs the vegetation is more varied. I consider that any plant which will grow in water or in the saturated margins of a pond, sometimes spreading into the water, and which can withstand being submerged for days, or even weeks, without injury, may be termed a "water plant," just as appropriately as a plant which actually lives in the water. Experiments made at Glasnevin prove that the list of such plants is far more extensive than one would think. It includes many of the Primulas, Irises, Trollius, Lobelias, and other subjects often grown in the herbaceous borders. Not only do such plants survive after being submerged for some time, or even covered with a sheet of ice, but they flourish in a way one rarely sees under ordinary conditions. A list of plants which have been cultivated under such conditions, and which during the spring were covered with water for over a fortnight, part of the time quite frozen over, is given at the end of this paper.

I feel that some apology is due for introducing the subject of this lecture, as it is no new one to the members of our Society. Twenty-eight years ago, September 8, 1881, Mr. George Paul read a very interesting paper, entitled "Hardy Water and Bog Plants," in which he described the water and bog gardens made by him, and gave a useful list of plants suitable for the purpose ; and Professor Boulger on June 19, 1900, dealt with the morphological and physiological peculiarities of aquatic plants, and with their origin; while on August 6, 1907, Mr. A. Bedford, of Gunnersbury House Gardens, lectured on Hardy Nymphaeas, and placed before your Society practically all the information available about this charming group of plants.

There is no more attractive addition to any garden than a quiet pond with suitably planted margins, and its attractions continue from the opening of the marsh marigolds at the end of February to the early parts of October. There is a quiet happiness in the appearance of such a pool, or pond, on a hot summer day in full sunshine, which is fascinating and which defies comparison with any other part of the garden. It is only when the same scene is contemplated in winter that one fully recognizes how much we owe to waterside vegetation.

When making a pond the supply of water has first to be taken into consideration, as without a regular supply, small or large, it is folly to make such a garden. If a pond with varied and graceful plants in and around it is inspiriting and beautiful, a dry mud bed with shrivelled vegetation is depressing and ugly; hence a water garden should be made proportionate to the certain available supply of water, large or small. It is surprising what can be done with a small supply. A rushing cascade is quite unnecessary; in fact it may be detrimental to the welfare of the plants, as quiet warm water seems conducive to the best results and to the most luxuriant growth and flowering.

In choosing a situation there is little difficulty where a stream is available. A pond can be made in any flat place near it and a supply of water brought from the stream, but there must always be means to regulate this supply. If there be no stream and a supply of water is brought by pipes some care is required in selecting a site. Select as low-lying a part as possible, a natural depression if one can be found, where one can stand above the pond and look down on the plants. A pond on a high level with lower parts of the garden beneath it looks incongruous and out of place. Another point worthy of consideration is that when masonry and cement have to be used the pond should not be raised more than a few inches above the level of the ground. A raised pond, or rather tank, may give scope for architectural design, but it is very discouraging to a gardener, and how to cover the sides will be a puzzle to the end of the chapter. If built below the surface of the ground there should be double walls, an outer water-tight wall, and an inner perforated wall. The space between these walls can be filled with peat and mud, and then planted with some of the many beautiful subjects named in the list. It is a great mistake to make a pond too deep: 18 inches to 24 inches at the deepest points, sloping up to a few inches at the margins, is ample for all requirements. A layer of mud may be spread over the bottom, and the individual plants can be planted in flat baskets, or in pans.

Now as to the plants themselves. We are not driven to the tropics for them. Among our native British plants are found some of the most beautiful, useful, and dainty for an outdoor water garden, for growing both in and around water. One naturally first turns to the water-lilies, and as a paper specially dealing with these has been read before the Royal Horticultural Society it would be superfluous for me to go into them in detail. No praise given them has approached exaggeration. You can have them for all purposes: for the great lake, provided the water is not too deep; for the large pond; for the tiny pool. For large water areas such sorts as *Nymphaea Marliacea* and its varieties, *carnea, albida,* and *chromatella, N. atropurpurea, N. Gladstoniana, N. colossea,* and *N. candidissima* are excellent; for very small ponds, *N. pygmaea* and *N. pygmaea* var. *helvola, N. Laydekeri rosea prolifera, N. odorata minor,* and perhaps *N. Ellisiana* will be found suitable, as they are of very moderate dimensions, and grow in 12 inches of water. It is rather with their collective than with their individual merits I wish to deal. The ordinary white native *Nymphaea alba,* dear to everyone, has its drawbacks. It is one of the earliest to flower, and it is the earliest to fade. It ceases flowering in July, and the leaves quickly turn yellow, so that by August a pond covered with its decaying leaves looks quite melancholy. In August the newer varieties are still gay and bright, and the leaves quite fresh, and flowering continues until October. I have seen flower buds frozen into a sheet of ice which covered the pond in October. This is a great gain, and greatly enhances the value of Marliac's race. The first water-lily to open at Glasnevin for several years has been the Swedish rosy variety of the common water-lily, *N. alba* var. *rubra* (*N.* 'Carpary'), but it has one disadvantage of going off early in the season. It is difficult to get it typical, and there are many very poor varieties in the market. Nymphaeas are not a class of plants which get their sustenance from water alone, as seems often to be supposed; they are in fact rather greedy, and where there is not a good supply of natural mud, pure cow manure, with no straw or litter, is an excellent food for them. It can be rolled up into small balls and thrown round the crowns just as growth begins. Where there is plenty of space the several varieties of *Nuphar* may be planted in association with the water-lilies, but they must be so placed as not to encroach on them, as the Nuphars are vigorous and aggressive, and owing to their strong rhizomes and roots they are difficult to get rid of. By far the nicest Nuphar is *N. advena.* Its leaves are dark shining green, and stand well up out of the water, and the centre of the flower is dark red; a good patch of it is both effective and pleasing. Other plants suitable for associating with Nymphaeas are *Phragmites communis, Ranunculus Flammula, Aponogeton distachyon, Stratiotes aloides, Cladium Mariscus, Sagittaria, Richardia africana,* and bulrush. A word of caution is necessary about some of these. The reed grass, *Phragmites,* and *Ranunculus Flammula* are apt to take possession of things if not kept in bounds, but their runners are easily caught and pulled out by a strong toothed rake. Why should a little labour and attention be grudged to water-plants? We give it freely to the alpines and herbaceous plants and recognize that it is necessary. Of the other plants a word may be said in praise of *Cladium Mariscus,* and the common bulrush, as they break the even surface and give variety. The grey foliage and drooping inflorescences of Cladium are particularly attractive, and it is not a plant which spreads much. *Richardia africana* is perfectly hardy if it is planted in water about 12 inches deep, so that the crowns are covered by water and are thereby protected from frost. Many illustrations have appeared in the horticultural journals of fine masses of this plant in the favourable climate of Cornwall, in which district its hardiness is never questioned. I may add that I have personal knowledge of its being hardy in all parts of Ireland, north, south, east, and west.

For planting in water, either associated with Nymphaeas or in patches by themselves, there are many plants of varied appearance and beauty, such as Equisetums, *Alisma*, *Sagittaria*, *Myriophyllum verticillatum*, *Carex stricta*, *Cyperus longus*, *C. vegetus*, *Aponogeton distachyon*, *Orontium aquaticum*, *Hottonia palustris*, *Typha latifolia*, and *T. angustifolia*. It may be said that some of these are ordinary native plants; but are they on that account any the less beautiful, or are they unworthy of a place amongst other water-plants? Any one who has seen a happily grouped colony of *Equisetum*, *Sagittaria*, *Alisma*, and *Hottonia* with some of the flowering rush (*Butomus*) amongst them will have no hesitation as to their worthiness. Whether or not they are to be included depends on size of the pond to be dealt with and must be left to individual taste and discretion. However, none but the smallest pond should be without a clump of the stately giant mace reed, *Typha latifolia*, or its more delicate and graceful congener, *T. angustifolia*.

Among plants which may be planted at water level in the margins and allowed to spread out over the water, so as to hide the formal edge, are *Menyanthes trifoliata*, *Calla palustris*, *Myosotis palustris*, *Comarum palustre*, *Veronica Beccabunga*, *Glyceria aquatica*, and *G. fluitans*. The two last named should be planted only round large sheets of water, as their growth is very vigorous. In mild localities *Parochetus communis* is also excellent for this purpose. I have seen long trails of it covered with blue flowers floating on the water and waving about in the current in the little stream at Mount Usher, in which position it has survived several winters.

For the swampy sides of lake, pond, or stream the choice of plants is extensive and varied, and their flowering season covers the greater part of a year. There are bright flowering plants from February to October, Calthas, Primulas, Irises, Spiræas, Orchids, Lobelias, globe flowers, and others. There are bamboos, rushes, sedges, grasses. There are ferns, such as *Lastrea Thelypteris*, *Onoclea sensibilis*, *Osmunda regalis*. There are giants such as *Gunnera manicata*, *Petasites gigantea*, *Iris aurea*, *Iris orientalis*, and *Spiraea kamtschatica*, and from these through every grade to pygmies such as *Parnassia*, *Primula*, *Lysimachia*, *Pinguicula grandiflora*, Gentians, *Mimulus radicans*, and others. In fact there are plants for all situations, for all seasons, and for all tastes.

In making a bog garden adjoining a pond, heavy holding clay should be excavated to a depth of 12 to 15 inches and a layer of stones, or clinkers from a furnace, should be placed in the bottom. The bed should then be made with ordinary rough peat; peat of a quality unsuitable for potting material will be found good enough, and with this may be mixed old potting material, such as that in which forced bulbs and ordinary greenhouse decorative plants have been grown, and where it can be obtained some refuse sphagnum from the orchid houses. Some good clean cow manure should be incorporated. Small pillars of the original soil may be left standing which will act as supports for flat stones on which one can get about through the plants. Where the natural soil is a light loam all these preparations are unnecessary, water-loving plants will flourish in it when thoroughly saturated, and only small portions need be excavated for the peat lovers.

It must be remembered that if properly nourished many plants grow to be veritable giants in suitable wet situations. *Iris orientalis* and *I. aurea* will grow from seven to eight feet high. *Lobelia fulgens, L. splendens* and *L. cardinalis* varieties, will grow over five feet high ; *Spiraea kamtschatica* and its beautiful rosy variety will grow eight to ten feet high. *Senecio japonicus* makes a very stately and handsome plant, and the fine varieties of *Iris laevigata* make grand clumps. Dwarf plants such as *Dodecatheon, Trollius, Primula pulverulenta, P. sikkimensis, Orchis latifolia* grow out of all recognition. For this good food is necessary, and I have found nothing to equal clean cow manure. It should be applied every spring when doing up the beds.

A note of failures is generally a useful addition to any list of plants for special purposes, and I therefore give a list of plants which are frequently recommended for water and bog gardens in the open air, but which I have found repeatedly die out when planted in water, or in a bog, liable to be submerged for any considerable length of time. *Arundo Donax, Miscanthus japonicus, Thalia dealbata, Myriophyllum proserpinacoides, Cypripedium spectabile, Gentiana asclepiadea, Valisneria spiralis, Hydrocleys Commersonii* (or *Limnocharis Humboldtii*), *Phormium tenax, Liatris spicata, Meconopsis, Spigelia marylandica*, Sarracenias, Darlingtonias, Bamboos. Several of these are, however, perfectly hardy and will live and thrive in damp situations, not liable to be submerged for any length of time.

It would take too long now to go in detail into indoor water-plants having given more time than I intended to the hardy section. There is, however, the same fascination about them, and they are even more interesting and quite as varied. I do not advise general cultivation of tropical species of *Nymphaea* for those who are not early risers, or who are not able to visit an aquatic plant house at dusk, as the majority of them only expand their flowers between 7 P.M. and 11 A.M. The flowers are closed during the day and frequently retire under the water. There is, however, a section which can be cultivated in an unheated house, in tubs or in shallow tanks, the flowers of which remain open all day and close at night. They are chiefly blue in colour, and are very attractive. Amongst the best of them are *N. gigantea* and its fine variety, *N. gigantea Hudsoni, N. stellata* and its varieties *coerulea* and *scutifolia, N. zanzibarensis* and its varieties, N. 'Wm. Stone,' and *N. pulcherrima*. The habit of growth of these exotic species of *Nymphaea* is quite different from that of our native species. They have instead of a rhizome a hard coated tuber to which they die down in winter. These tubers may be taken up about the end of October, rolled up in balls of mud, or in some old sphagnum, and kept in quite a small space, provided they are safe from rats.

List of Plants which have Withstood prolonged Submergence at Glasnevin.

Acorus Calamus. Sweet Flag. July.
A. gramineus variegatus.
Alisma Plantago. Water plantain. July.
A. ranunculoides. Lesser water plantain. July.
Anagallis tenella. Summer.
Aponogeton distachyon. Water hawthorn. June.
Astilbe grandis. August.
A. rivularis. July and August.
Azolla pinnata.
Butomus umbellatus. Flowering rush. July.
Calla palustris. Marsh Calla. July.
Caltha palustris. March.
C. polypetala. April.
Cardamine palustris fl. pl. May.
Carex pendula.
Cicuta.
Cladium Mariscus. Prickly twig rush.
Comarum palustre.
Cyperus longus.
C. vegetus.
Dodecatheons. June.
Droseras. Sundews.
Epilobiums.
Epipactis palustris. July.
Equisetums.
Eriophorum.
Glyceria fluitans.
G. aquatica.
Gratiola officinalis. August.
Gunneras.
Habenaria.
Helonias bullata. June.
Hippuris vulgaris.
Hottonia palustris. Early June.
Hydrocharis. Frog-bit. July.
Iris aurea. June.
I. Delavayi. July.
I. orientalis. June.
I. pseudacorus. June.
I. pseudacorus alba. June.
I. sibirica and varieties. May and June.
Juncus effusus. Candle rush.
J. effusus spiralis.
Lastrea Thelypteris.
Lilium pardalinum. August.
Lobelia Dortmanni.
Lobelias. September.
Lysimachia nummularia. July.
L. nummularia var. *aurea.* July.
L. punctata.
L. thyrsiflora.
Lythrums. July, August.
Mentha.
Menyanthes trifoliata. May, June.
Mimulus luteus. July.
M. radicans.
Monarda didyma. July.
Montbretias. August and September.
Myosotis palustris.
Myrica Gale. Bog myrtle.
Myriophyllum. Water-milfoil.
Nuphar. June and July.
Nymphaeas. Early June to October.
Oenanthe fistulosa. Water-dropwort. July.
Onoclea sensibilis.
Orchis foliosa. July.
Orchis latifolia. June.
Orontium aquaticum. Golden club. June and July.
Osmunda regalis. Royal fern.
Ourisia coccinea. June, July.
Parnassia. Grass of Parnassus. August.
Parochetus communis. July, August.
Petasites gigantea.
P. palmata.
Phragmites communis. Reed grass.
Pinguicula grandiflora. May onwards.
Polygonum cuspidatum. August.
P. sachalinense.
P. sphaerostachyum. June and July.
Potamogeton natans.
Primula japonica. May and June.

P. pulverulenta. June.
P. rosea. April.
P. sikkimensis. June, July.
Ranunculus aquatica. Water-crowfoot. May on.
R. Flammula. Small spearwort.
R. Lingua. Great spearwort. July.
Richardia africana.
Rodgersia peltata. July.
Rumex Hydrolapathum. Water-dock.
Sagittaria. Double varieties.
S. sagittifolia. July.
Saururus cernuus.
Saxifraga diversifolia.
S. Herculus.
S. peltata. April.
Scirpus lacustris. Bulrush.
S. zebrinus.
Senecio Clivorum. July.
S. japonicus. July.
Sparganium ramosum. Bur reed.
Spiraea Aruncus.
S. kamtschatica.
S. kamtschatica rosea.
S. lobata.
S. palmata.
S. palmata elegans.
S. Ulmaria. Meadow sweet.
Stratiotes Aloides. July.
Trillium grandiflorum. June.
Trollius. In varieties. May, June.
Typha. Mace reed. Autumn.
Utricularia.
Veronica Beccabunga.
Villarsia. June, July.
Zizania latifolia. Autumn.

BEES IN RELATION TO GARDENING.

By Walter F. Reid, F.I.C., F.C.S. (*Vice-Chairman of the British Beekeepers' Association*).

[Read August 17, 1909.]

Many of the greatest advances of modern science have been due to the recognition of the fact that even the minutest organisms and particles of matter are fully as worthy of detailed study as the grosser units that could alone be investigated before the invention of the microscope. The utility of such study has been abundantly demonstrated by the discovery of the bacterial origin of disease, and the isolation of radium, which has revolutionized our views of matter itself. Botanists were among the first to recognize the importance of the infinitely little; knowing how small a seed could produce even the largest tree they readily accepted the microscopic marvels that were listened to with incredulity by many of their contemporaries. The discovery of the fertilization of flowers by means of pollen opened a new era for the horticulturist; but it is only since the classical researches of Mendel have been appreciated at their true value that the reign of law has succeeded to the reign of chance in the improvement of those products of the vegetable world that are necessary for our existence.

No sooner was it ascertained without doubt that pollen played a part in the production of some of our most important crops than a series of investigations into the methods of its distribution commenced, and these investigations are still by no means complete. It is established beyond doubt, especially through the patient researches of Darwin, not only that insects are concerned in the pollination of flowers, but that certain insects and flowers are adapted to each other in a most wonderful manner. He found that bees especially contributed very materially to the production of some of our most important crops; in fact, without their aid the seed would, in many cases, have been sown in vain.

While all kinds of bees are useful to the agriculturist it is the hive bee in particular that is his greatest friend, yielding, as it does, useful products of its own in addition to its utility as a fertilizing agent. That the beneficent action of these little workers was not sooner realized was due in a large measure to the erroneous belief which prevailed as to the nature of the substance which bees could be seen to collect from the flowers. Until the middle of the eighteenth century the little pellets of pollen which bees bring into the hive were mistaken for wax. It was not then known that wax was secreted by the bees themselves in glands specially adapted for that purpose. That bees generally visit the same kind of flower on each flight had not escaped notice; Aristotle was aware of the fact more than two thousand years ago; but the important bearing of this habit on the fertilization of flowers has only recently been fully appreciated.

There are several ways in which the hive bee conveys the fertilizing pollen from one flower to another. and, in considering these we must recollect that it is the worker bee only that visits flowers. Neither queen bee nor drones are ever seen on flowers; they are consumers of food and do not collect it. The organs of the worker bee are specially adapted for the work it has to perform while the corresponding organs of the queen and drone are but partially developed. First in importance to the bee itself as a means of collecting pollen are the so-called pollen-baskets with which the hind-legs are furnished. It is upon these that the bee brings home the pollen that is one of the ingredients of the food upon which it feeds its young. The hairs upon the body and legs are, however, the first instruments used in detaching the pollen from the flower. If you observe a bee issuing from a flower in which pollen is plentiful you will notice that it hovers for a moment in the air, and that its legs are in rapid motion. They are collecting the pollen grains from the body hairs and packing them upon that portion of the hind legs that is specially adapted to receïve and retain them. But the bee cannot itself reach all parts of its body and some pollen is sure to remain on the hair. The tongue of the bee is an organ of great importance from the point of view of the horticulturist, as it can convey pollen into flowers which are much too small to permit of the entrance of the insect itself. The tongue is even more densely clothed with hairs than the body, so that any pollen grains that may come into contact with it are caught and retained. Some flowers are visited by the bees for pollen alone, especially in the spring, but, whether it come for pollen or honey, the bee cannot avoid carrying out the duties which the flower requires in return for the nutriment given.

The mutual advantages of this arrangement are very great. Where a plant is dependent upon the wind for fertilization an enormous quantity of pollen has to be produced, with a corresponding strain upon the plant, and yet the fertilization is so imperfect that in some cases, of which the date palm is a familiar instance, harvests cannot be relied upon without human assistance. It has been estimated that one maize plant will produce 50,000,000 grains of pollen. Compared with such figures the quantity of pollen that a single bee can carry may seem small; but the activity of the insect more than compensates for any deficiency in this direction. Estimates as to the number of blossoms a bee visits on each journey differ considerably; but there is little doubt that it may amount to several thousands.

While the pollen gathered by the bee is of primary importance to the flower itself the same does not appear to hold good with regard to the honey, which is certainly one source of attraction to bees. Some authors have considered that honey is secreted by flowers as a bribe for their useful visitors. But some plants, such as the laurel and the Jerusalem artichoke, have nectar glands upon their leaves, and these are frequented by bees and wasps without any apparent benefit to the plant. Although it is customary to speak of bees gathering honey from flowers, what they really collect is nectar, which differs both in chemical constitution and consistency from the honey that we get from the hive. The nectar extracted from the flowers is stored in a small bladder known as the honey sac in which it is subjected to a preliminary process of concentration. On arrival at the hive the contents of the honey sac are ejected into a cell in which a further process of ripening and concentration takes place. Until the honey is so concentrated that it will not ferment the bees do not cap the cells over, and the bee-keeper who extracts uncapped honey soon finds to his cost that he has still a lesson to learn from his bees.

Whether the hive bee visits flowers for honey or pollen it invariably encounters some device by means of which it is deprived of a sufficient quantity of the latter to fertilize the flower. I use the term hive bee advisedly, because the humble bee is less conscientious and often refuses to pay the price that the flower has the right to demand from it. Its powerful jaws enable it to bite through the corolla of a flower and thus to reach the nectary without coming into contact with the pollen. Darwin states that he has seen whole fields of red clover treated in this way, and that in the neighbourhood of Bournemouth he did not succeed in finding a single flower of *Erica Tetralix* that had not been perforated. Such is the demoralizing effect of the desire to acquire riches quickly that even the highly civilized hive bee will utilize the holes gnawed by the humble bee, and where these abound, it will fly straight to them, without even looking at the proper entrance to the flower. Where humble bees are plentiful, gardeners will frequently notice the blossoms of scarlet runner beans perforated at their base, but I have not myself noticed any diminution in the crop of beans in such cases.

The devices by means of which flowers force bees to deliver up a portion of their load of pollen are ingenious in the extreme. They have been fully and ably described by Darwin, Müller and Lord Avebury. In the time available to-day only a few representative flowers can be dealt with; but those illustrated each represent large and important families of plants.

* * * * * * * *

(About twenty lantern slides were shown, illustrating the various devices by means of which fertilization is effected by the bee, and cross-fertilization secured.)

* * * * * * * *

In order that I might demonstrate the effect of the absence or presence of bees on the crop of fruit I carried out a series of experiments this year and have photographed the results. Gooseberry, red currant and black currant bushes were enveloped in muslin before the blossoms opened and were thus protected from the visits of bees. These bushes were then compared with similar bushes in the same rows and grown under exactly the same conditions with the one exception of the muslin envelope. The illustration (fig. 69, C.) shows a protected gooseberry bush which yielded only six gooseberries. The two adjoining bushes (fig. 69, A and 69, B) yielded respectively 151 and 167 berries; they having been visited freely by bees from hives about fifteen yards distant. Two years ago I happened to photograph the same bush that was protected this year in order to show a friend who complained of the failure of his gooseberry crop that I had been more fortunate than he. The number of berries was nineteen when the photograph was taken (fig. 69, D); but a heavy toll had then been taken by the birds. The six berries on the protected bush were probably due to the presence of a raspberry beetle which was enclosed in the muslin. These beetles frequently emerge before the blossoms of the raspberry are open and then feed on the pollen of the apple, strawberry, and gooseberry. The protected red currant bush (fig. 70, B) yielded a few currants, chiefly as single berries. In this case ants crawled up the main stem and may have fertilized some of the flowers, or the wind may have assisted in distributing the pollen. A similar bush in the same row had a heavy crop of currants but in the photograph (fig. 70, A) they have been somewhat thinned by the birds who commenced eating them before they were ripe. It is sometimes stated in the daily

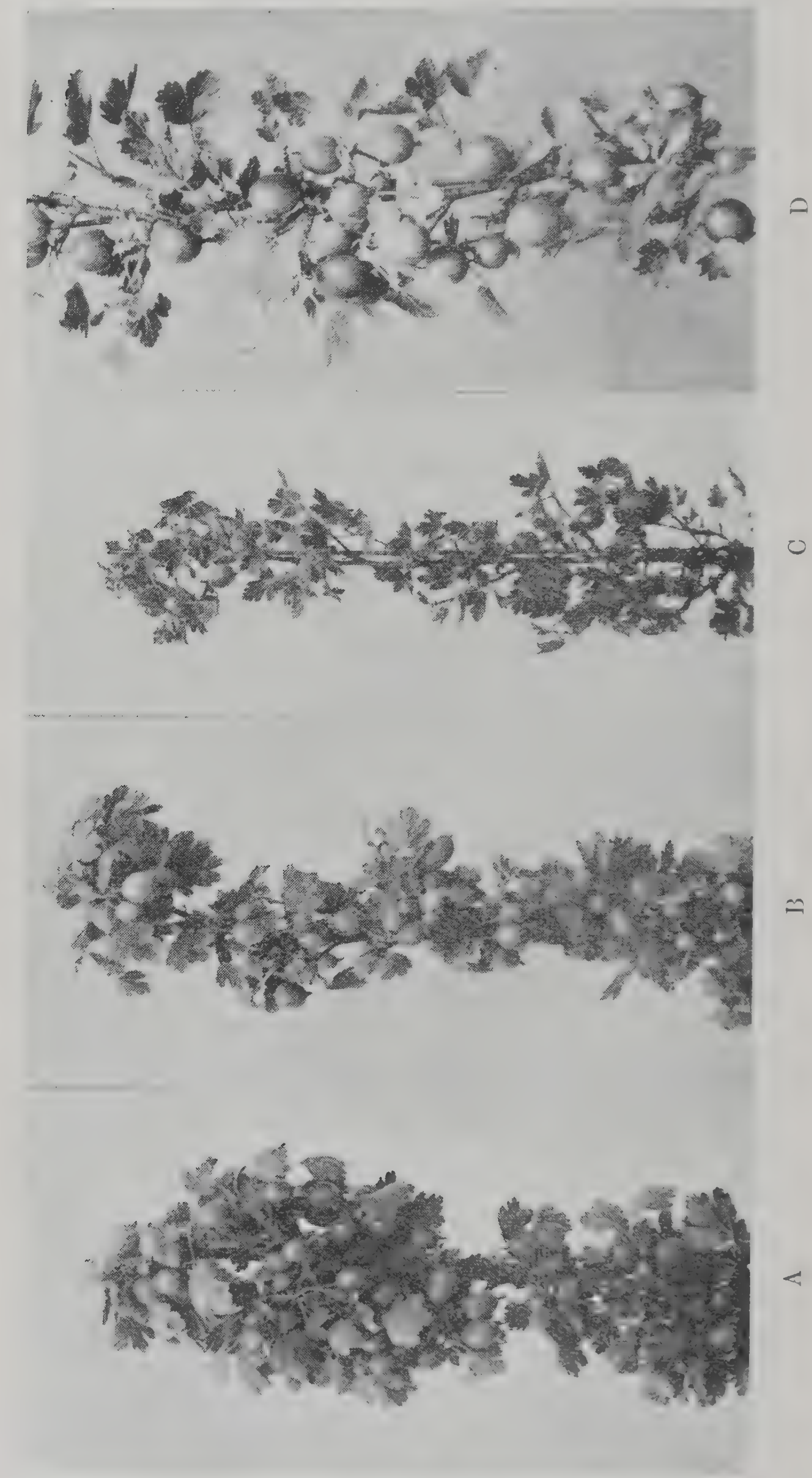

Fig. 69.—Gooseberry Bushes.

A and B, Open to insect visits; C, protected from insect visits; D, the same branch as C in a previous year when open to insect visits.

press that the depredations of birds are due to the lack of moisture and that the provision of a supply of water will protect the fruit. This year there was not a single day upon which a plentiful supply of water was not available at a distance of a few yards, but the depredations of the birds have been even worse than usual.

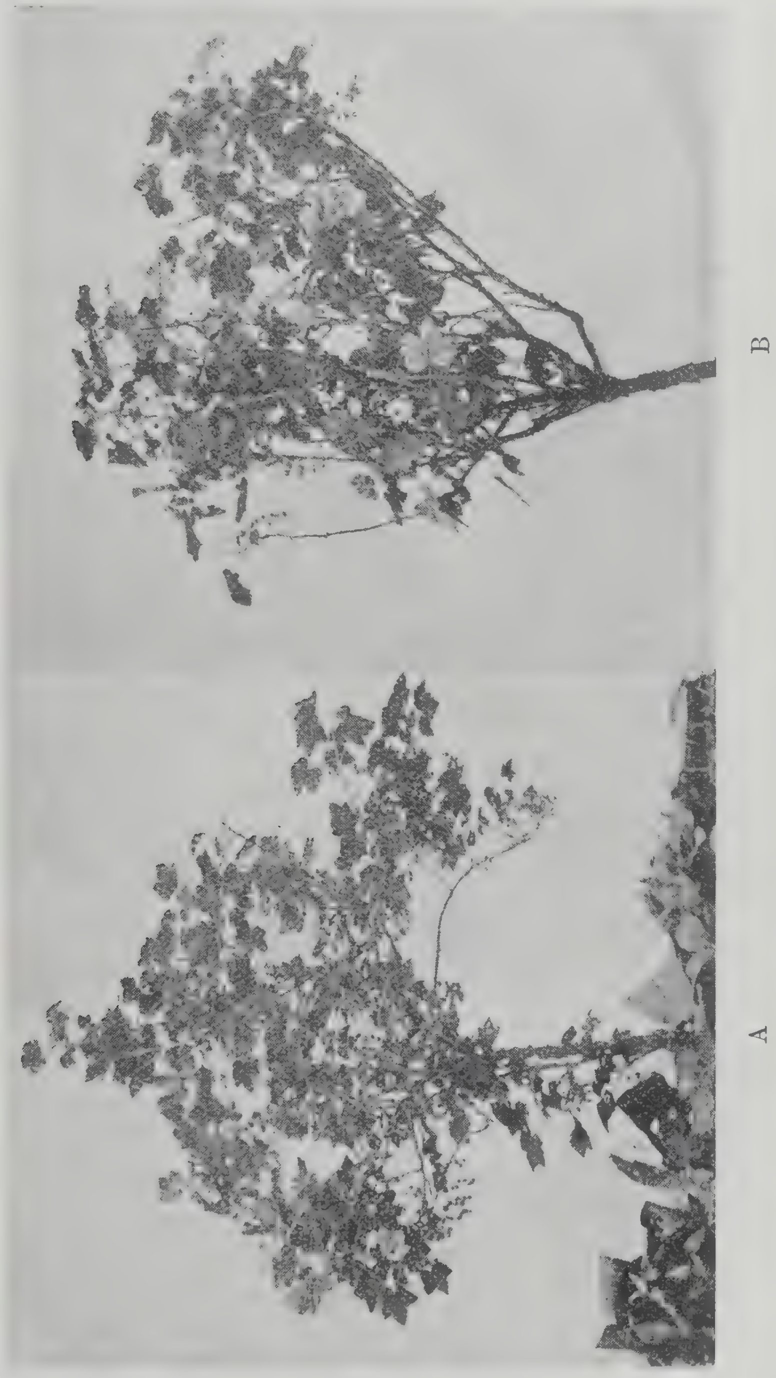

FIG. 70.—RED CURRANT BUSHES.

A, Open to insect visits; B, protected from insect visits.

The isolation of the black currant bush by means of the muslin was almost complete, for only two berries appeared (fig. 71, B). In this case it was remarkable that the foliage of the protected bush was less fully developed than that of its neighbours. The adjoining black currant bushes gave an average yield (fig. 71, A).

The influence of the hive bee in securing the proper fertilization of fruit trees is so generally known that the apathy of fruit growers in applying this knowledge is somewhat remarkable. Those who do so, however, have every reason to be satisfied with the result. Mr. R. Brown, of Somersham, Hunts, is a well-known fruit grower who some years ago was dissatisfied with the yield of fruit from his trees and, on the advice of a friend, procured some hives of bees as a remedy. The result far surpassed his expectations, for, in the ensuing year, his crop of bush fruit increased fourfold. Being desirous of ascertaining whether Mr. Brown's subsequent experience agreed with his first results I communicated with him and he writes on August 10, as follows :—

"I am thoroughly convinced that bees are the chief factors in the fertilization of fruit blossoms, and the production of fruit both as regards quality as well as quantity. Living as I do right in the midst of a fruit growing district and being an ardent bee-keeper as well as horticulturist I have made this subject a special study and have not the slightest hesitation in affirming that where bees are kept, much better results obtain in the garden and orchard. In 1907 when we had a very cold spring and when bees could work only at brief intervals and at short distances from home, there was an abundance of fruit in three orchards close to my apiary of fifty stocks. I closely watched their movements and made a special point of noting the results, and can affirm that, with the exception of these three orchards in the immediate vicinity of the apiary there was scarcely any fruit at all in this district.

"This year, the weather being favourable at brief intervals for the bees to work, I have got the heaviest crop of apples I have ever had, and up to the present I have gathered 150 bushels off two acres, comprising the varieties Ecklinville, Peasgood's Nonesuch, Beauty of Bath, Julian, June-eating, &c., being only a first picking, and scarcely half the crops. This is a season when apples are quite scarce in our district!"

This favourable testimony of a practical fruit grower might be amplified by the remark that Mr. Brown obtains a large quantity of excellent honey from his hives.

Mr. T. W. Cowan, chairman of the British Bee-keepers' Association, one of our highest authorities on apiculture, has long advocated the keeping of bees as a most efficient aid to the horticulturist. He has been good enough to send me two instances of the benefit derived from the introduction of bees which I will give you in his own words :—

"Some years ago Lord Sudeley started fruit orchards at Toddington, and for some time they were quite unproductive; in fact it was a question of giving them up. It was suggested that bees would be of use, and a Scotch bee-keeper was engaged to take charge of an apiary on the spot. The result was that the fruit trees very soon showed the difference and became remunerative. The trial was so successful that the orchards were enlarged, and a large jam factory was established to preserve the fruit. There were 200 colonies in this case assisting the fruit grower which turned an unproductive orchard into a very productive one.

"Another example is in California. I happened to be visiting Mr. Butler of Penryn, California, and he showed me over his ranch, where he had forty acres of peach trees. He complained that the early Alexander peach, which is a very good one, was a very shy bearer; in fact he said that it was such a poor bearer that he intended to grub up all the trees and replace them with Hale's Early. The trees were a fine sight, some fifteen to twenty feet in diameter, and as they were in full flower they made a grand show. We examined the trees, and I noticed that there were no bees about; in fact, looking at a number of trees I only occasionally saw a wild bee. It at once struck me that it was the want of bees that was the difficulty, and that perhaps if there were plenty of them the trees might bear better. I asked how far away was the nearest bee-keeper, and was told five miles. This of course was no use, as the country is covered with ranches and bees at that distance would not do any good at Penryn. I recommended Mr. Butler to try a couple of hives to begin with, and to get them placed among the trees at once. This was done, and the benefit was felt the very same year. We were asked there in June, and Mr. Butler showed me his trees and said it was the first time he had had so much fruit and was quite satisfied that it was the bees. He was so pleased that he got some more hives, and the

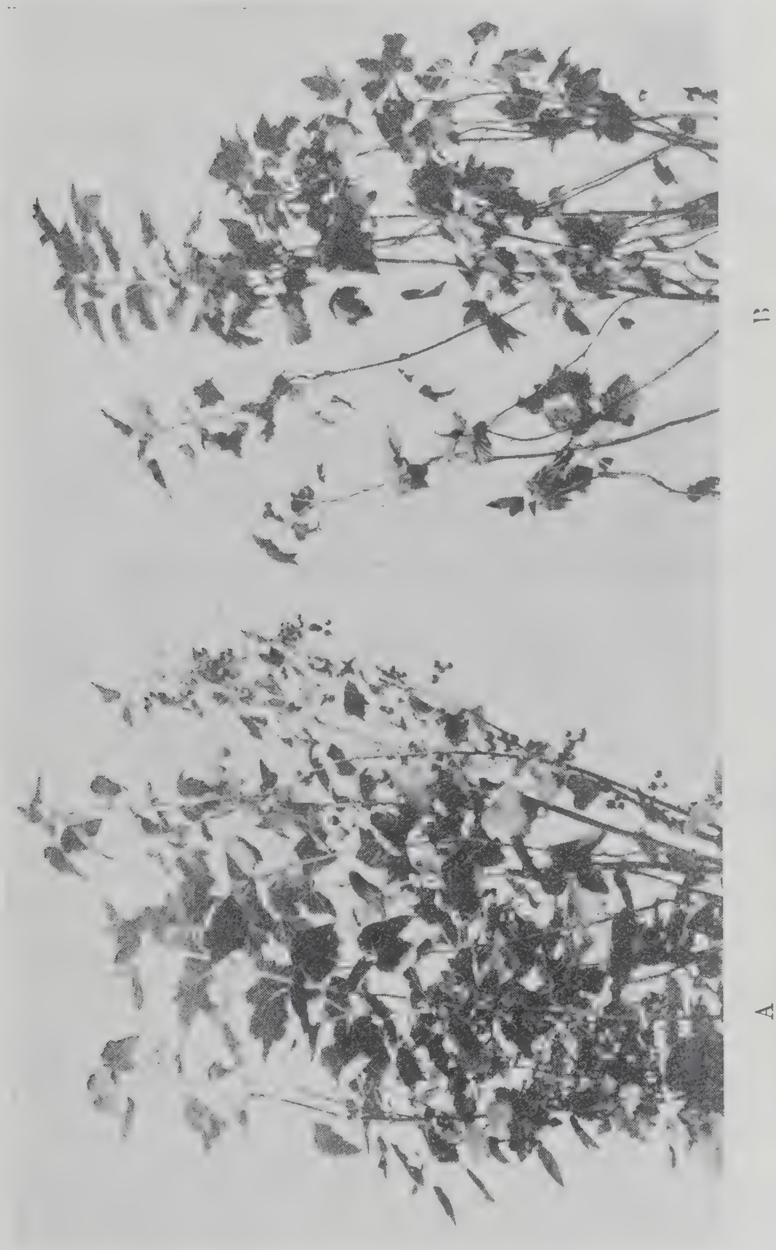

Fig. 71.—Black Currant Bushes.

A, Open to insect visits; B, protected from insect visits.

following year the trees bore so abundantly that the fruit had to be thinned. In this case, also, an unproductive ranch was converted into a productive one. This was not all, however, for the neighbours also began to feel the benefit and small fruits that were not very profitable began to yield sufficiently to become profitable.

"There is another aspect in connection with the fertilization of fruit trees in which bees are indispensable. It is well known that some are self-sterile, and require pollen from another tree brought to them to make them fertile. A tree is self-sterile if it cannot set fruit unless planted near other varieties. An indication of self-sterility is the continued dropping of young fruits, and is generally overcome in California by planting other varieties among the self-sterile ones. Cross-pollination is thus obtained by means of bees or other insects, but, as at the time of fruit blossoming there are twenty bees flying to any one other insect, it is evident that cross-pollination is principally dependent on them. Even with fruits that can fertilize themselves it is an advantage to have cross-pollination, as the result is larger and finer fruit."

Fig. 72.—Plum 'Black Diamond.'

From my own experience I can fully endorse all that Mr. Cowan says about the utility of bees to the fruit grower. In the neighbourhood of London and other large towns one often hears the remark that plum and pear trees will not bear fruit because of the smoky atmosphere. It is not the atmosphere so much as the absence of fertilizing insects, especially hive bees, that is the cause of sterility. The trees blossom, and as I have proved by actual experiment, will bear fruit if bees are brought to them while they are in flower.

It is important, in our uncertain climate, that the bees should be near the fruit trees. In 1907 the spring weather was very uncertain, and many fruit growers in my neighbourhood had very poor crops. In the short intervals of fine weather, however, my bees were so busy on the blossom, that my trees bore heavy crops. Fig. 72 shows a branch of a 'Black Diamond' plum and fig. 73 a 'Pond's Seedling' plum, both photographs taken in 1907.

There are few fruit growing districts that are really adequately supplied with bees, and capital amounting in the aggregate to many millions of pounds is either unremunerative or only partially remunerative. Instead of being an expense, bees are the most remunerative agricultural investment with which I am acquainted. Under proper management there are few districts in this country where the sale of the bee products alone will not repay the outlay on bees and hives in two or three years. A careful examination of a fruit district by an expert bee-keeper who has some horticultural experience would, in most cases, reveal whether the district is sufficiently supplied with hive bees. The British Bee-keepers' Association, which is to apiculture what this Society is to horticulture, has affiliated Associations in the chief counties of England and is always pleased to assist in this or any other question connected with bee-keeping.

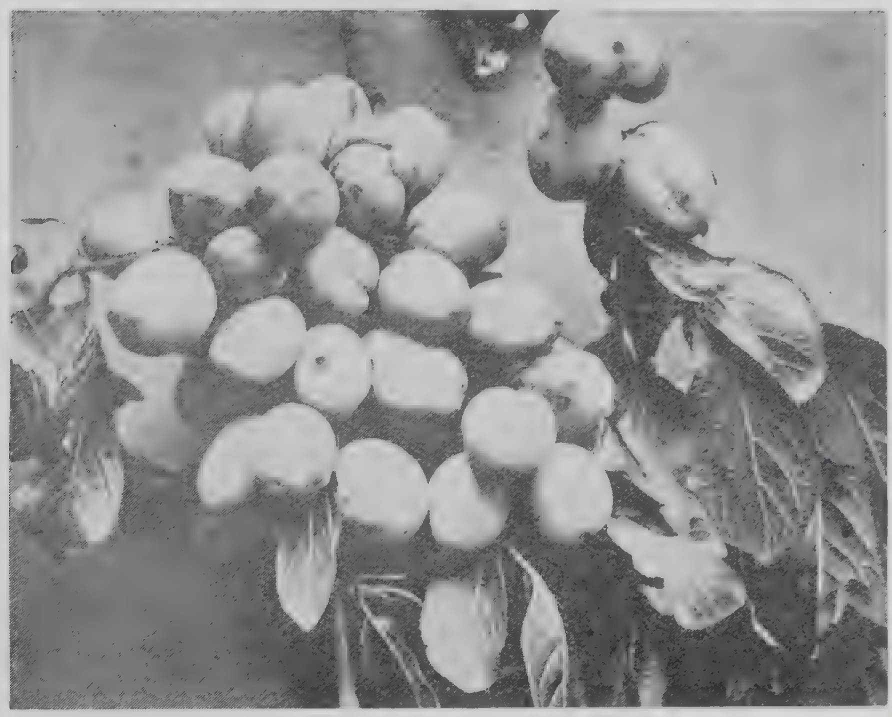

FIG. 73.—PLUM 'POND'S SEEDLING.'

THE GARDENS BY THE LAKE OF COMO.

By James Hudson, V.M.H.

[Read August 31, 1909.]

The gardens that I have had the privilege of visiting by the Lake of Como have, in my opinion, far more to recommend them than many others in Italy, some of which I have also seen: for instance, Isola Bella, on Lake Maggiore, shows, I think, far too much evidence of the skill of the architect and of the sculptor; and again, at the Villa d'Este at Tivoli, there is a preponderance of waterfalls and of masonry. Too much artificial stone work mars the beauty of a garden, and detracts from its charm.

Around Como masonry is not so obtrusive, at least not in the gardens that I have seen. These gardens, like many others in Italy, owe their existence to the munificence of the Italian nobility of two centuries or more ago: those around Como probably to the Milanese families of high rank; those at Isola Bella to the Counts of Borromeo, and those at Rome to the Borghese family and others.

The gardens I have visited are situated chiefly at Bellagio, at Cadenabbia and at Menaggio. These beauty spots are comparatively close together, Bellagio being seen from both Cadenabbia and Menaggio, but Cadenabbia is shut off, so to speak, from Menaggio by the contour of the lake. To my mind, having seen Como from the town of Como itself, up to the northernmost point of the lake, there is no spot to surpass in beauty the three that I have named. True, I have not been down the Lecco branch of the lake, and therefore cannot make a comparison with that, but I do not think it can possibly surpass these in beauty, or in the grandeur of its scenery.

My two visits have been in August. On the first, the weather was intensely hot, with scarcely any breeze, but on the second the heat was tempered by a cooling breeze blowing down the lake from its northern extremity. Last year I stayed for some days at Lugano, another lovely spot, where it was decidedly warmer than on Como. From the lake we visited Monte Generoso, 5,590 feet in height, where we had a magnificent view of a wide range of mountains towards the north and north-west, with the Lake at our feet; while to the east we could clearly discern the Lake of Como, with the town of Bellagio upon its promontory. I had often wondered how it was that such tropical luxuriance was to be seen around Como. Now, from this view point I could see how the lake is surrounded by mountain ranges from 2,000 to 3,000 feet in height, and the gardens upon its shores sheltered from the extreme cold, and nestling in such favourable situations along the water line. The shelter from keen biting winds, and the clear Italian sky explain a great deal, while the moisture arising from the Lake itself must be conducive to luxuriant vegetation.

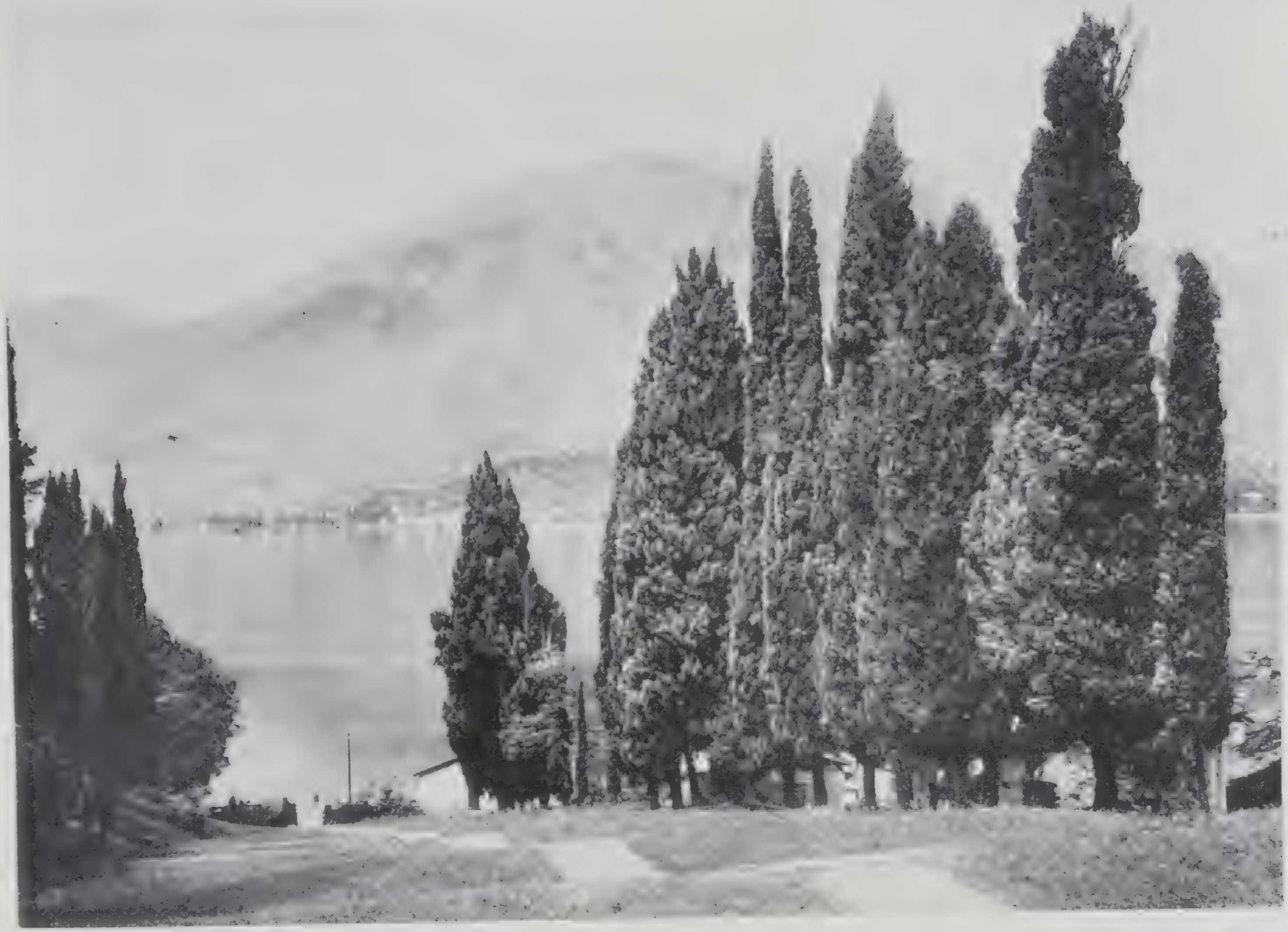

Photo: Wehrli, Zurich.

FIG. 74.—CYPRESSES BY THE LAKE OF COMO.

(To face page 204.)

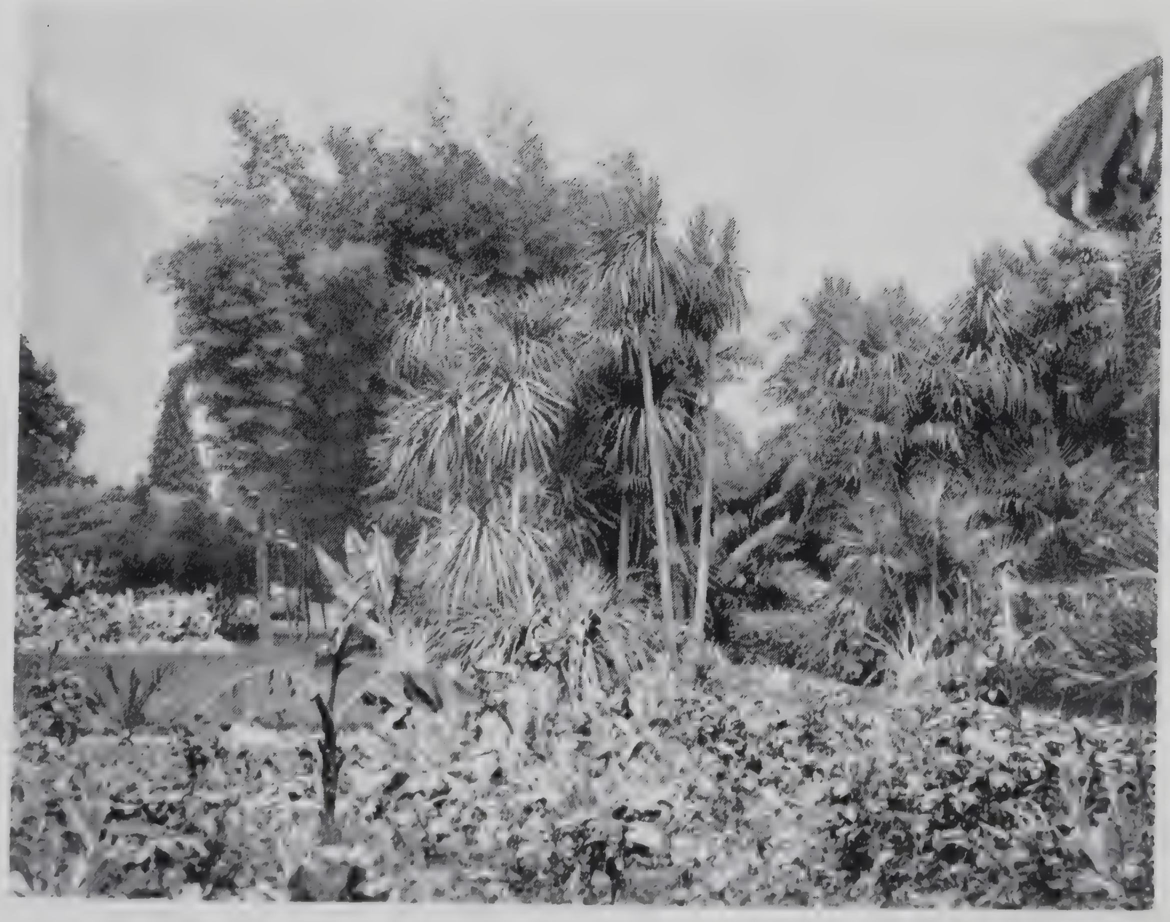

FIG. 75.—BAMBOOS, DRACAENAS, PALMS, &C., IN AN ITALIAN GARDEN.

Before describing the gardens around Como, I wish to refer briefly to those at Lugano. One cannot but be struck with the remarkable growth some plants attain, and how they thrive in the most luxuriant fashion. This was particularly the case with *Bignonia radicans*, the sight of which in such profuse flower might carry one's thoughts to the gardens around Algiers. The soil in which it grows so well is a stiff calcareous loam in which lime rubble and the débris from the mountain sides were freely incorporated. In England we usually grow it in rich soil with either peat, or leaf-soil predominating. This is, as we know, conducive to growth, but not so much to floriferousness. The best examples that I saw were at Lugano.

Nerium Oleander also thrives well around the Lake wherever the sun shines for a good part of the day. This plant is cultivated in soil similar to that in which the Bignonia thrives, in almost every instance. It may often be seen projecting from the sides of the walls that hold up the garden fronts of the houses, where it appears to have been planted when the walls were built. It is a plant that evidently thrives well in the full blaze of the sun, where its growth becomes well matured and capable of withstanding several degrees of frost. The Oleander, to give it its more popular name, is equally at home in the gardens around the Lakes of Como and of Maggiore.

The best examples of *Nelumbium speciosum* were also at Lugano, where, in the gardens of one of the principal hotels, I saw a fine mass growing splendidly and showing abundance of buds. This also was in the full blaze of the sun, a pool having been made for it upon the sloping bank leading to the hotel.

After traversing a most delightful and fertile tract of country, we stayed for some days at Menaggio, which we made our centre. In the hotel garden there were several immense bushes of Oleander; these were in most profuse flower and formed quite a feature. There are several distinct forms of Oleander in Italy: the ordinary double pink-flowered variety; the white, quite pure in colour, and semi-double; and some very brilliant singles, one of which struck me as being most distinct and effective wlth its brilliant deep crimson flowers. Other shades of singles were also to be seen. (I may note in passing that twenty years or more ago there was a collection of Oleanders at Chiswick in which there were many different shades of colour.)

At the same hotel and in a portion of the garden running down to the Lake-side were several well-grown plants of *Sophora japonica pendula* flowering freely as standards. This plant is perfectly hardy, in the south of England at least, and should receive more attention and be planted more freely than at present; it is a most graceful and effective subject for the water side.

The first garden we visited at Menaggio, about 300 to 400 feet above the town itself, was the garden and extensive pleasure grounds of the Villa Vigoni, at one time known as the Villa Mylius. From these grounds a magnificent view of the Lake is obtained, showing the three arms into which it is divided at Bellagio, as well as of that town itself. The Villa, a palatial building, is finely situated amid most luxuriant vegetation, being sheltered upon its northern and north-eastern sides. Immediately surrounding the mansion is a lawn kept somewhat in the English style, and in the best of condition, with but few flower-beds to mar its beauty. Upon the walls of the Villa were *Tecoma jasminoides* flowering most profusely, *Mandevilla suaveolens* as we rarely see it in England, *Solanum jasminoides* making a good display, *Bougainvillaea glabra Sanderiana* doing well, its bracts being of a deeper shade than usual (this was also grown in bush form and plunged in the grass here and there). A species of *Sterculia*—probably *S. nobilis*—was in profuse flower, as well as an *Abelia* that I did not recognize.

In the open, *Lagerstroemia indica* was just opening its first highly coloured blossoms, the plant being in luxuriant growth. *Hydrangea paniculata* was grouped in masses, and of the purest possible white, better than we usually see it in England. *Desmodium penduliflorum* (syn. *Lespedeza bicolor*) was thriving well. Of *Diospyrus Kaki* there were several specimens which made me quite envious. *Hibiscus sinensis* was doing well with many flowers to expand. The upright Cypress, such a fine feature in the Italian landscape, was planted in permanent situations with telling effect.

Passing from the mansion, the lawn is broken up into shady glades and walks where the grass, somewhat mossy, is not kept so close as we see it in English gardens, a system that we might, I think, adopt more than we do with distinct advantage, both in ultimate effect and in the saving of labour. In a sheltered spot—*i.e.* sheltered from the prevailing winds—I noted a grand mass in vigorous growth of *Musa japonica*. The pleasure grounds away from the mansion are almost entirely of an undulating character, the natural outcome of their situation upon the lower slopes of the mountain. This permits the attainment of many charming effects and of the choice of spots congenial to the growth of various shrubs and trees. Many palms were thus advantageously placed with distinctly good effect; among them fine specimens of *Pritchardia pacifica* and of *Chamaerops Fortunei* (syn. *Trachycarpus excelsus*): the former remarkable for its stout, sturdy stem, and the latter for its height. Of Bamboos there were huge masses of *Phyllostachys mitis*, which is evidently a favourite form in this locality; several of these were more than 30 feet in height. There were also *P. aurea* and *P. nigra* which were, though not so tall, in fine condition.

The Coniferae were represented by *Araucaria imbricata*, dark green in colour, dense in growth, and in more than one instance with cones developing. *Cupressus funebris* (the Weeping Cypress) first sent to England by Fortune from Northern China, was in good condition and character, especially one very fine specimen such as we rarely see in this country. What struck me as most remarkable among the many fine Coniferae in this garden was an immense spreading growth of *Juniperus Sabina*, the original stem of which was only about 4 feet in height (knotted and gnarled in all directions), and at that height put on its drooping habit and covered a space about 50 feet by 40 feet with dense, dark green, healthy foliage. The ground upon which it rested sloped sharply downwards, and when looked at from below was one dense mass of verdure. Among Acacias there were several good plants of *A. dealbata* and *A. cultriformis*, the latter not nearly so much cultivated, I think, as it should be. *A. lophantha* had also grown into a fine specimen.

The gardens around Como are noted for the remarkably fine specimens of *Magnolia grandiflora*. There is in this garden an example hard to surpass, still growing most vigorously. It is not less than 60 feet in height, and well furnished. A large spreading *Laurus Camphora* was also a prominent feature of interest. Indian Azaleas were grouped in great masses, and must, when in flower in the spring, produce a fine effect. *Jasminum grandiflorum* was, among many other climbers, most noteworthy. In shaded positions, chiefly on sloping banks, *Cyclamen hederaefolium* was just commencing to flower.

The outstanding feature of this fine garden was its good keeping with a minimum amount of lawn mowing, and dense carpeting, here and there, where grass would not grow, of what I believe to be *Smilacina japonica* which is of a grasslike growth with white flowers and charming blue berries ; it is known in French gardens as *L'Herbe aux Turquoises*. No symptoms of drought are to be seen in this beautiful garden, for water from higher altitudes percolates through the soil sufficiently to prevent this. The shaded walks in the grounds make it possible to take as much exercise as one may desire, even in the hottest weather, and the pleasure is enhanced by the fragrance of the pines.

The garden of the Villa Carlotta at Cadenabbia, which we next visited, is better known than that of the Villa Vigoni. As one journeyed thither by boat the many plants of Oleander to be seen even in the smaller villas *en route* formed a very striking feature. Frequently *Lagerstroemia indica* kept it company. Well-shaded pergolas, covered some with vines, others with Wistaria, and others with Fortune's yellow Rose, were passed on the journey. Upon entering the garden, the Villa Carlotta is seen at the end of a lovely vista, situated a considerable distance higher up and approached by terraces, every possible opportunity being taken of clothing the walls either from below, or from above, with a diversity of climbing plants. Other plants are employed upon the walls in vases or ornamental pots. It is in fact a most beautiful vista either to look up, or to look down when one has arrived at the topmost terrace. In a large circular basin many of the hybrid Nymphaeas were thriving well and flowering freely without that robust growth to which they attain in this country. *N. lucida*, *N. Marliacea chromatella*, and *N. odorata suavissima* were the most conspicuous, and all the twelve varieties were luxuriating in the warmth and sunshine. Near this pond were four fine plants of *Caladium esculentum*, well adapted to their positions, as were some fine plants of *Papyrus antiquorum*. Here and there were dotted plants of *Impatiens Holtzii* flowering freely. Several plants of pink Ivy-leaf Pelargoniums of varied shades stood upon the terraces and drooped over the walls, so that they were seen to the best advantage from below. Another plant employed in a similar manner, but stood upon the parapets, was *Russelia juncea*, and wreathed in its bright scarlet blossoms it produced a most beautiful effect. These were always placed in the warmest positions, and not necessarily near to the pink Geraniums. Of other flowering plants *Bignonia radicans*, a very tall plant, was a most lovely object, its blossoms being highly coloured. Well ripened wood undoubtedly aids it in producing a profusion of blossoms. In the somewhat shaded nooks of this terraced garden good use is made of the Myrtle, particularly of the Box-leaved variety. Here and there a fine specimen of *Phormium Colensoi* in a pot added to the effect, as did the fine-foliaged Bonaparteas, especially *B. juncea.* Upon a broader plateau running right and left in front of the Villa are the noted pergolas of Oranges, Lemons and Citrons, a sight well worth the journey to see. Where it is possible (not in this country, of course), no better subject can be chosen with which to cover a pergola. One scarcely knows which to admire the more, the beauty of the fruits or the fragance of the many flowers. Among the many fine plants upon this plateau are some of *Musa Ensete*, with a little carpet-bedding surrounding them—somewhat, I think, out of place. After passing through the cool marble saloons, so well known to tourists, we come upon huge but graceful masses of Bamboos including *Phyllostachys mitis*, *P. aurea*, and *P. nigra*, a trio that it is hard to beat. These are very tall, especially *P. mitis*, and in luxuriant growth, and are well placed in the immediate neighbourhood of the Villa itself. *Bambusa japonica* (syn. *B. Metake*) was not far removed from these, and fully 20 feet in height, forming quite an archway over the path.

These gardens also are noted for their fine specimens of *Magnolia grandiflora*, the largest of which is quite a tree, nearly 60 feet in height, with a stem measuring 5 feet in circumference at a few feet from the ground. Near this Magnolia is a grand old plant of *Wistaria sinensis*, also with a fine trunk of its own near the ground, while higher up its branches seek support from other trees. In a sheltered and moist spot grows a fine example of *Philodendron* sp., the ground being carpeted with the blue Lycopodium—*L. caesium*—in its true colour. Soon after we came upon quite a forest of *Phyllostachys mitis*, the finest mass I have ever seen, about 40 feet in height, with stout, robust stems.

Here, too, there are, as may be expected, several fine specimens of palms. A sturdy old veteran is *Phoenix dactylifera*, with a stout stem of fine proportions. *Brahea filamentosa* (syn. *Pritchardia filifera*) is also a prominent object in a sunny position and in a similar situation there is a fine specimen of *Cocos australis*, a slow-growing, but extremely handsome palm when seen, as here, with its typical glaucous-grey foliage. In another spot *Phoenix canariensis*, which grows so well along the Riviera, is equally at home here. Of the *Chamaerops* there were dense masses of *C. humilis* in their true character with glaucous-green leaves, and of *C. Fortunei*, which with their tall stems, had a distinctly good effect. Several of these palms were to be met with in well chosen situations, and generally upon sloping ground, their needs as regards moisture being undoubtedly supplied from the water percolating through the soil from the higher levels.

The same remark applies to the many fine examples of the Coniferæ to be seen here, as at the Villa Vigoni. At the Villa Carlotta, however, there is a preponderance of trees that are of a rather more tender character; the difference in altitude will explain this. Among the many large trees the most notable are *Abies orientalis*, 50 feet or more in height, quite hardy in cooler localities, but here in fine condition; *Picea Morinda* (syn. *Abies Morinda*), also evidently quite at home; *Cupressus*

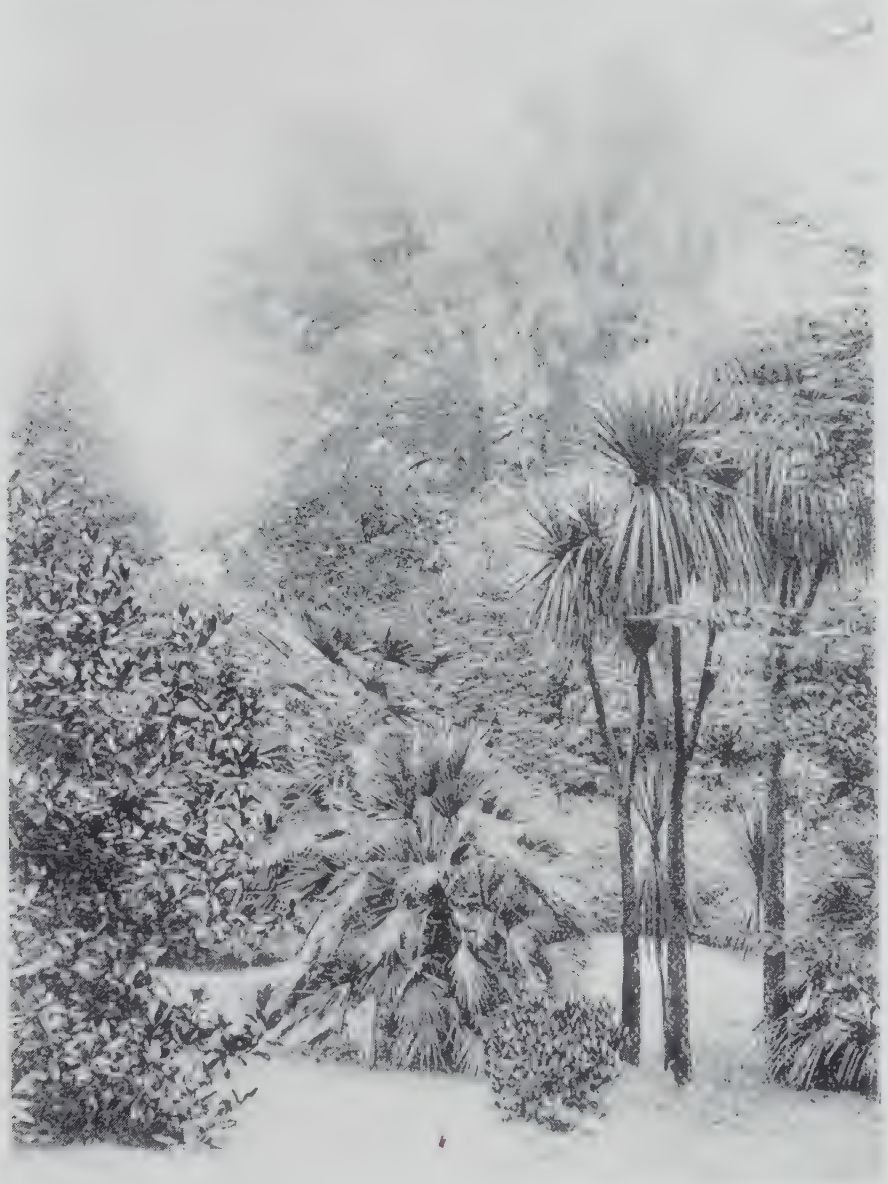

Photo: Brunner, Zurich.

FIG. 76.—PALMS AND DRACAENAS AT VILLA CARLOTTA.

(To face page 208.)

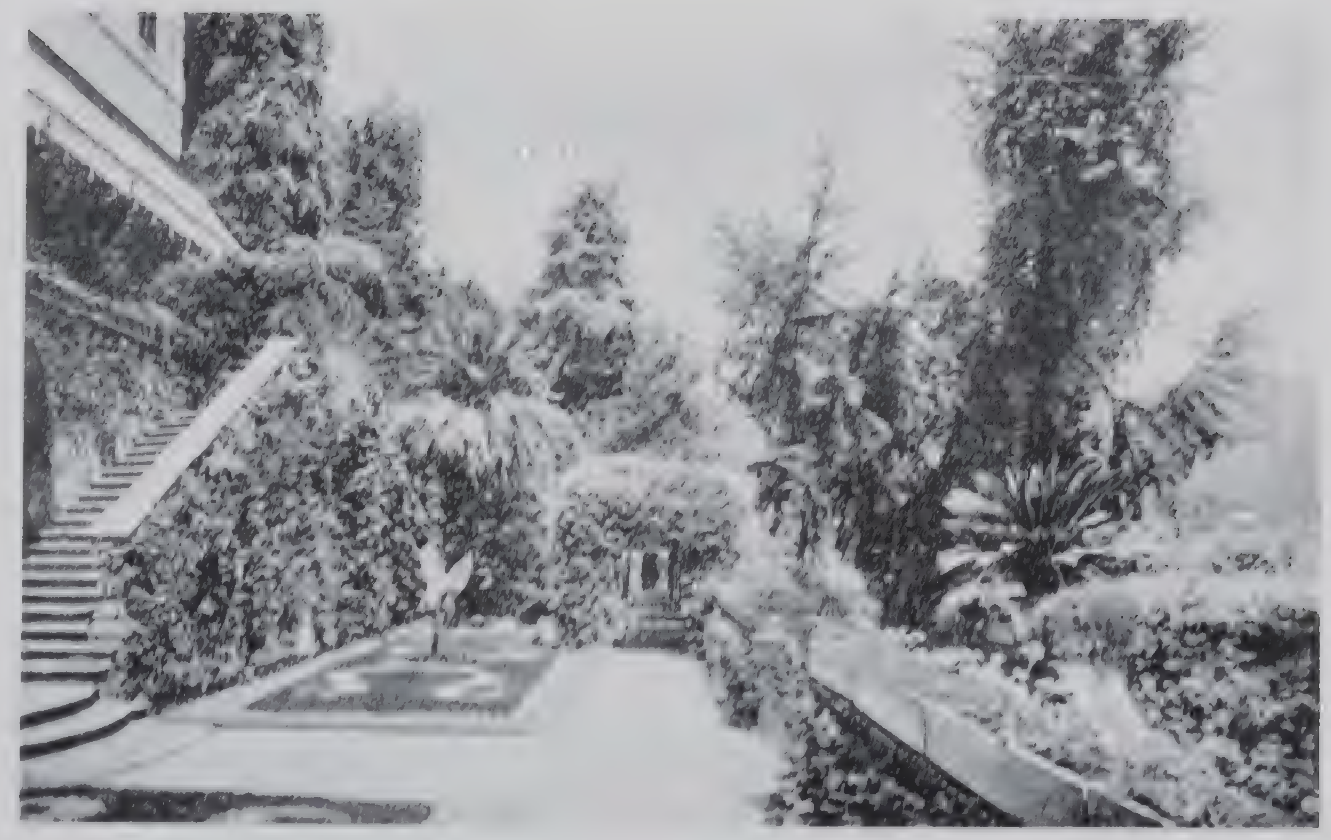

Photo Brunner Zurich

FIG. 77. CARPET BEDDING AND PERGOLA AT VILLA CARLOTTA

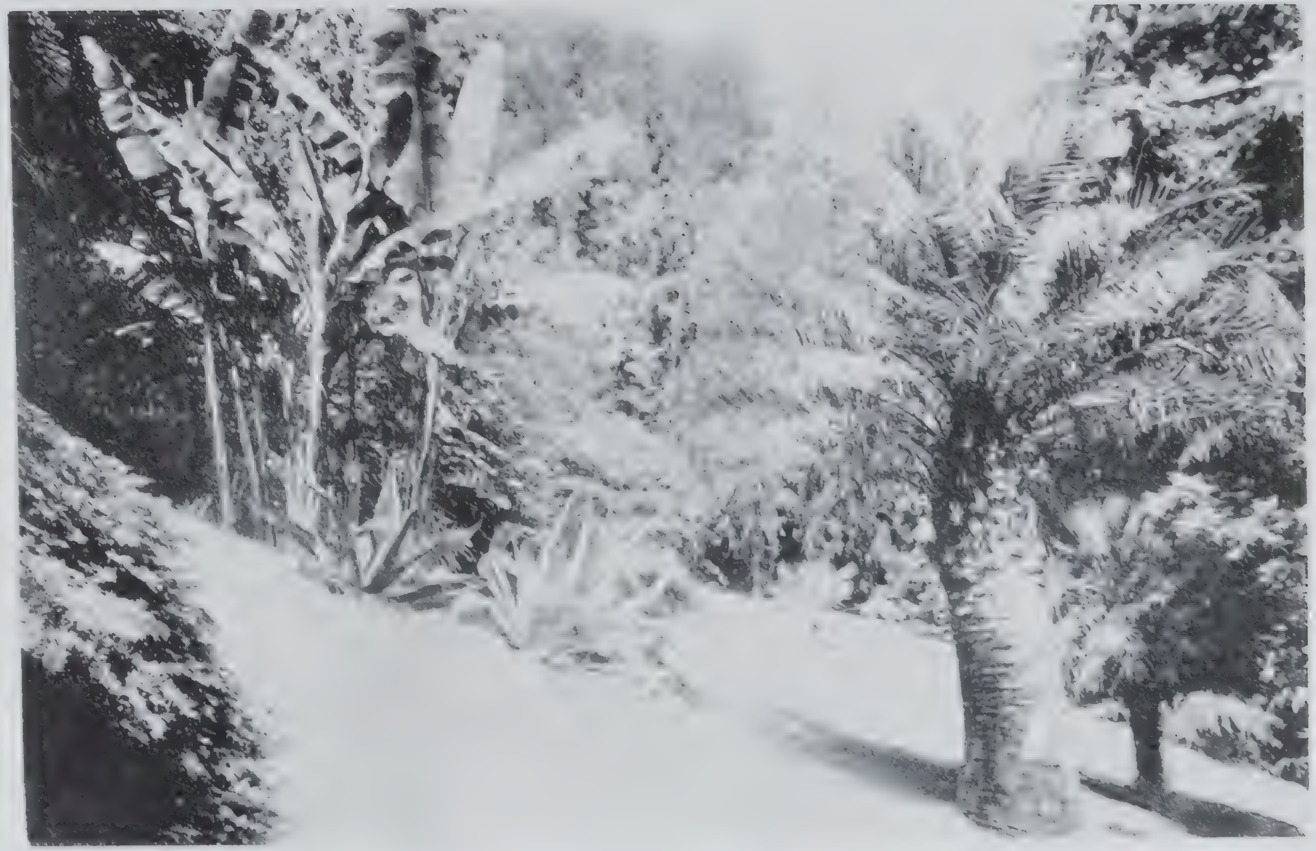

Photo. Brunner, Como.

FIG. 78. IN THE GARDEN OF VILLA CARLOTTA.

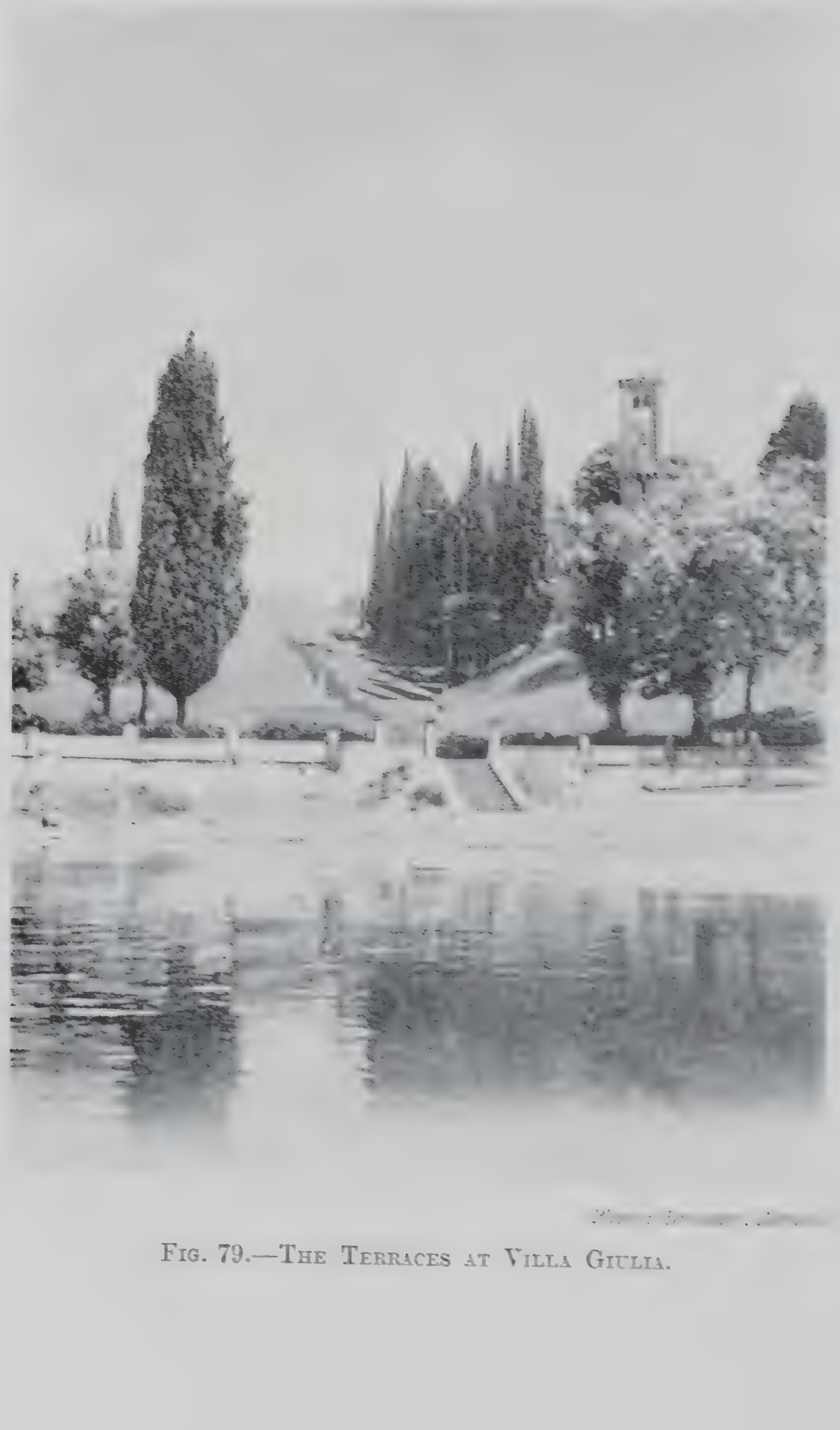

Fig. 79.—The Terraces at Villa Giulia.

funebris (called here *Cupressus drupacea*), particularly good. In one instance a tall climbing China Rose had entwined itself among the branches with a picturesque effect. Of the genus *Retinospora* several good specimens are to be met with. The Lebanon and the Himalayan Cedars—*Cedrus Libani* and *C. Deodara*—were thriving as large specimens, both evidently enjoying the clear atmosphere and the moist heat. *Araucaria braziliensis*, tender in this country, was quite at home there.

One very fine feature is the dell, apparently a natural formation, wherein are to be seen *Hydrangea hortensis* of a deep blue colour, amid the shade of Bamboos and of Plane trees above them. One comes upon all kinds of surprises in these gardens—here a lovely peep of the Lake, with the mountains in the distance, and there in a sunny warm spot a group of characteristic plants. For instance, upon almost inaccessible ground there will be groups of Agaves, Aloes, Yuccas and the like, and again groups of Phormiums where the soil is moist. If the ground slopes more than usual, a congenial home is found for many of the Cactus family, and *Lotus pelyorhyncus* thrives well in similar situations. In quite moist and shaded spots *Strobilanthes Dyerianus* was growing well and in good character, and not far from it I saw *Maranta zebrina*. The better varieties of the stove Dracaenas were also succeeding well, being bright in colour. For these and similar plants a carpeting was made of *Fittonia argyroneura*. The large masses of *Azalea indica alba* were particularly fine, and in their season must give a wealth of blossom; they were chiefly in groves or on grass. A fine old tree of *Ginkgo biloba* (syn. *Salisburia adiantifolia*), with a Virginian Creeper, approaching its autumnal tints, clinging to its stem and lower branches, formed a pretty feature. In deep damp recesses there were large masses in rampant growth of *Adiantum capillus-veneris*. As at the Villa Vigoni, a free use of *Smilacina japonica* was made for carpeting the ground where it was hopeless to think of grass growing at all.

This fine garden is full of interest to every plant-lover, and is kept in admirable condition. A portion of the front, next the Lake and near the Villa, has a fine avenue of Plane trees, which forms a cool resort during the heat of the day. This avenue is alluded to by Longfellow in his 'Poem of Places.'

'I pace the leafy colonnade
  Where level branches of the plane
Above me weave a leaf of shade
  Impervious to the summer rain.'

From Cadenabbia it is easy to reach Bellagio by the steamers that ply upon the Lake. The garden front of the Grand-Hôtel Bretagne at Cadenabbia is very well kept, and the Oleanders were just coming into full flower, and *Lagerstroemia indica*, which had thriven so well in the past as to have had a severe pruning, was now showing for flower again. Tall palms, chiefly *Chamaerops Fortunei*, formed imposing features. *Wistaria sinensis* was flowering quite freely owing to the exposed situation and the warmth. *Dianthus* 'Napoleon III' planted in masses in beds was flowering well, and so were Celosias and Cockscombs. The finest effect, however, was got from the large masses of *Hydrangea* *hortensis*, of the deepest blue, planted upon banks facing west; these were really splendid. *Bignonia radicans*, growing in the bush form, was most effective. *Musa japonica*, as a foliage plant, added to the pleasing features of the garden.

Our next visit was to the garden of the Villa Melzi, which, speaking generally, faces north-west, so that in the shade cast by the luxuriant forest trees there are many cool spots where several plants thrive well, and in sunny places full advantage is taken with plants that require more warmth. The gardens skirt the Lake for a considerable distance, but do not appear to extend so far back upon the higher ground as some others that we visited. Here there is a considerable expanse of turf interrupted by fine trees and Bamboos, but not so much as to obscure the scenery. It has in fact in many respects much the appearance of a well-planted English garden. Here, again, are some fine masses of *Phyllostachys mitis*, producing a good effect, with stems bare at the base for several feet; these reach fully 40 ft. in height. Planted in a similar way was *Musa japonica*, which when arranged in groups is, I think, much better than where only a few growths are allowed. Groups of *Chamaerops Fortunei*, containing plants sufficiently far apart to afford perfect development, formed at a distance most striking objects. There is, too, a fine evergreen Oak which the gardener told me was *Quercus mexicana*.

Conifers, too, are planted in groups, and some were already suffering from being planted too closely. One excellent example of this system of planting, not so much crowded as some others, was afforded by *Cedrus Deodara*. Of *Cedrus atlantica glauca* I noticed one very fine specimen, the finest I have ever seen. *Tsuga canadensis* (the Hemlock Spruce) is represented by a fine specimen 50 feet or more in height, and well developed. *Picea Morinda* (syn. *Abies Smithiana* and *A. Morinda*) was in its true character, with long pendulous branches. *Pinus palustris* was represented by a fine example—the tree, it is true, was an old one, but none the less handsome. There were several good specimens of *Thujopsis dolobrata variegata*, with the silvery variegation well marked. In the warmest spots I noted *Hibiscus rosa-sinensis* employed as a bedding plant, but I remember to have seen it better in these gardens in 1899. Canna 'King Humbert,' to use its English name, is also bedded out here as it is in England, but grows much finer than we can hope to have it. It is one of the very best Cannas for bedding. I have used it in this way for several years now. (Its long deferred recognition was only made at the last Meeting of this Society, on August 17, when it gained an Award of Merit.) It is handsome both in foliage, with its dark bronzy red colouring and leaves fully 1 foot in width, and in its flowers, a rich orange crimson, while it has so sturdy a growth as to withstand the wind remarkably well. *Russelia juncea* was again seen here as a vase plant and nothing could be more effective than the dozen vases of it all in perfect condition. There is also a large and thriving collection of Citrons, Oranges and Lemons in large vases. Towards the end of the gardens, and nearer to the town of Bellagio, is a sheet of water with several of Marliac's water lilies upon it, but the situation is rather too shaded for them to flower freely. Near here, but in an ideal position, were again seen numbers of Hydrangeas still of the deepest blue; more were being planted. At this end of the garden one might imagine oneself in one of our Devonshire gardens, the Firs and other forest trees being of large size with broad grassy walks among them.

Our next visit was to the Villa Giulia which occupies a unique position: the front of the Villa faces in the direction of Cadenabbia, whereas the gardens run down to the water upon the Lecco branch of the Lake. Towards Cadenabbia there is a broad avenue of the upright Cypress which forms an imposing feature, now that the trees are well developed, from whichever end it is viewed. At the entrance there is a large group of *Chamaerops Fortunei* consisting of many tall specimens of different heights. Here again the blue Hydrangea was seen just at the season when at its best. Several specimens of the Date Palm also grow towards the pleasure grounds on the farther side of the Villa. An avenue of Horse Chestnuts, casting a heavy shade and affording a cool retreat, is planted in the pleasure grounds. *Araucaria braziliensis* thrives, and in favoured situations palms, including *Phoenix canariensis*, were growing into large trees. A distinct-looking *Euonymus* called *E. fimbriata*, which is not hardy, I think, with us, grows in this garden. *Magnolia grandiflora*, where seen as it is here, and in other favoured localities, of tall growth and pyramidal outline, with its lustrous green foliage, is a distinctly fine feature of the garden.

A grand view is obtained from the garden front facing down the Lake (the Lecco branch) across to the mountains beyond. The best specimen hitherto seen on this tour of *Latania borbonica* (syn. *Livistona australis*) occurs here; it was growing well, but cannot, even at its best, be a serious rival of either *Chamaerops Fortunei* or of *Pritchardia pacifica.*

A great feature of this garden is presented by the terraces by which the Lake is at last reached. They do not form an obtrusive feature, and each plateau and the walks also are clothed with verdure. No set design is aimed at, but every plant is placed with due thought and regard to its requirements. The upright Cypress was planted in appropriate spots and grown into specimens exceedingly good and vigorous. Upon one of them a Wistaria had established itself for support, reaching 30 feet or more up the stem. Tall Oleanders were jutting out of the walls and, as usual, flowering freely. A fine avenue of Citrus was formed of specimens in large vases. In a shaded spot a group of *Justicia rosea*, in full flower, formed an uncommon feature in the open garden. For the first time I noticed *Brugmansia suaveolens*, and it was flowering well. (It is to be regretted that this Brugmansia is not more grown in English gardens than it is. Where not infested by the insect that punctures its leaves in quite an early stage of development it forms a fine plant. What the insect is, I do not know.) Where water drips from terrace to terrace, fine masses of *Papyrus antiquorum* and *Arundo Donax variegata* were planted. Groups of Azaleas were also planted on these terraced gardens. The Wistaria is found most useful for covering the balustrades, and *Magnolia conspicua* finds a congenial home on the walls along with *Bignonia capreolata*, which is no doubt the best species to grow outside in England. *Sophora japonica pendula* was so planted and grown as to form a grateful shade for a seat; *Laurus Camphora* had monopolized a considerable space, and formed a fine feature, not so fine, however, or so large as the large specimen in the gardens at Isola Bella, on Lake Maggiore.

Cryptomeria japonica thrives well, and is very much happier than I have seen it in England. In quite a sunny spot *Punica granatum* fl. pl. —the Pomegranate—flowers freely along with *Paulownia imperialis*, which, when flowering, forms a conspicuous object with its many-flowered panicles of large blossoms. Both the Loquat (*Photinia japonica*) and *Diospyrus Kaki* were in good condition upon the terraces and in warm recesses. The steps leading to the Lake and boathouse descend, at last somewhat steeply, so I did not follow them, but one could not fail to observe their attractive features. From this spot we ascend again by shady walks and pass on the way several fine examples of *Cedrus Deodara*, *Sequoia gigantea*—a very fine, healthy tree—and other Conifers, as well as a group of *Musa japonica*, which is now evidently more in favour in this locality than *Musa Ensete*. Every opportunity is taken to make the most of the space, and every turn has something to interest the lover of a garden.

Villa Serbilloni next claimed our interest. It is situated upon the promontory forming the extreme northern boundary between the Lecco and the Como branches of the Lake, and the view embraces a wide expanse of country, including, in many instances, the Swiss mountains, with their snow-capped summits. This Villa is now a dependence of the Grand-Hôtel, Bellagio. It has many natural advantages, which might be made much of if it were in the hands of a garden enthusiast; now the tendency is, to a great extent, to cultivate it from the utilitarian point of view. Here are breaks of Indian Corn thriving well, and there vineyards in suitable aspects, with in addition many Olive trees, until one reaches the higher ground; for this Villa stands well above the town and its surroundings. From the time of entering the gates the carriage road is throughout of a winding character until the summit is reached far above the Villa itself. From the several admirably arranged view-points beautiful prospects are opened in almost all directions, including a wide expanse of the Lake. From one particularly good spot we could see across to Varenna, while at this point it would be possible to cast a stone down the precipice into the Lake, some hundreds of feet below. Most of the pleasure grounds and parterres are near the Villa, where there is also a small nursery and a reserve garden. On dry sunny spots a free use is made of the larger species of Agaves and of the hardier Yuccas, the latter flowering freely. There are also several fine specimens of palms, some of which appeared to have been recently moved. These were placed in admirable positions for effect. *Magnolia grandiflora*, as usual, was thriving well. Among Conifers a fine specimen of *Sequoia gigantea* clothed to the ground with branches was noteworthy. One of the chief features of the uppermost part of the grounds is the forest-like appearance of the surroundings, so that one might imagine he was back in England again.

There are several other well-kept and noted Villas around this portion of the Lake, but we had not the time to visit them. Among them Villa Trivulzio, formerly Villa Poldi, Villa Trotti and Villa Puniana. These are all worth visiting. Each of the gardens visited had distinct features of its own, and no two possessed quite the same natural advantages. The Italian gardener is painstaking in his work, while the courtesy shown to us, and the information given, whenever asked for, were quite characteristic of the Italians and in every respect most admirable.

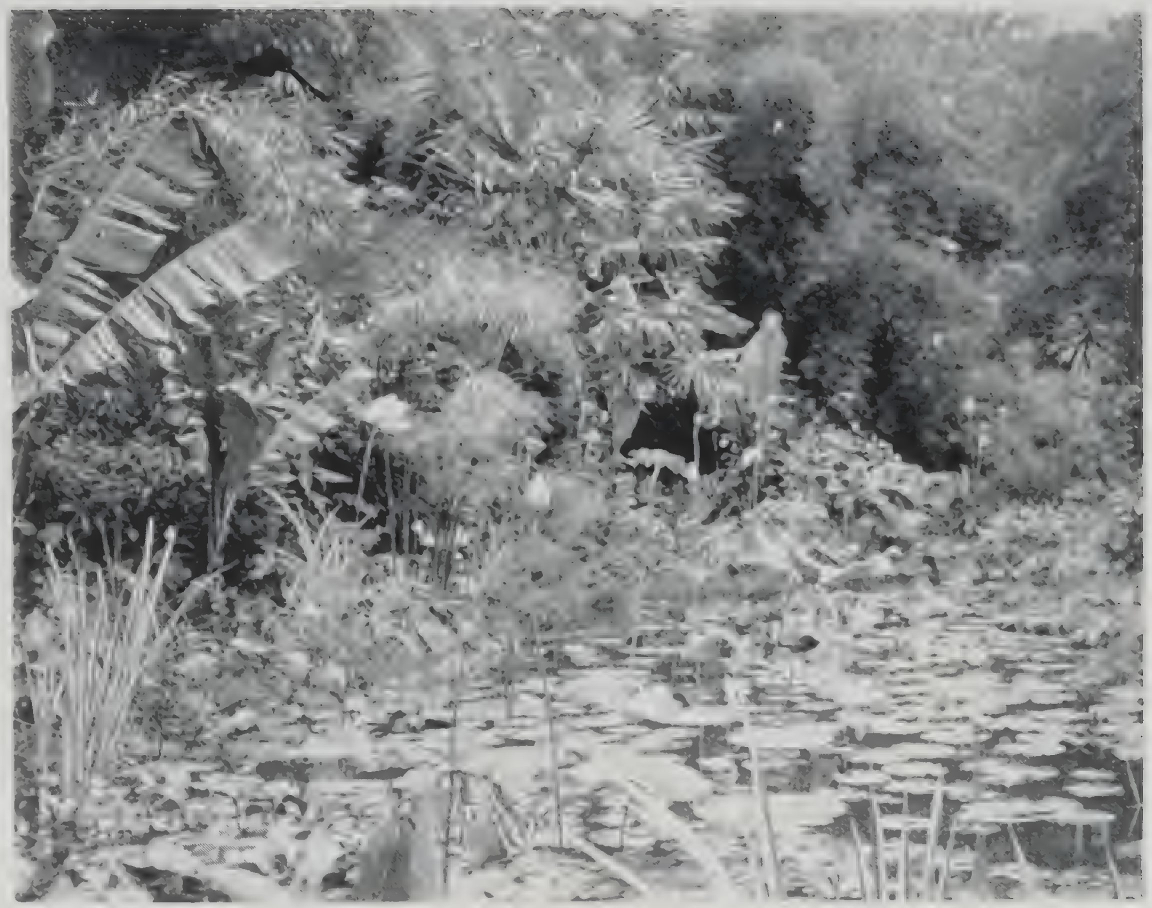

FIG. 80.—LOTUS AND WATER-LILIES IN AN ITALIAN GARDEN.

(*To face page* 212.)

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

VI.—A Disease of *Lavatera trimestris*.

By F. J. Chittenden, F.L.S.

Several specimens of *Lavatera trimestris* have been received at the Laboratory in a dead or dying condition in each of the past three years. The first came from Alton, in Hampshire, and others subsequently from widely separated localities, mainly in the south of England, though the disease is not confined to any particular part of the country.

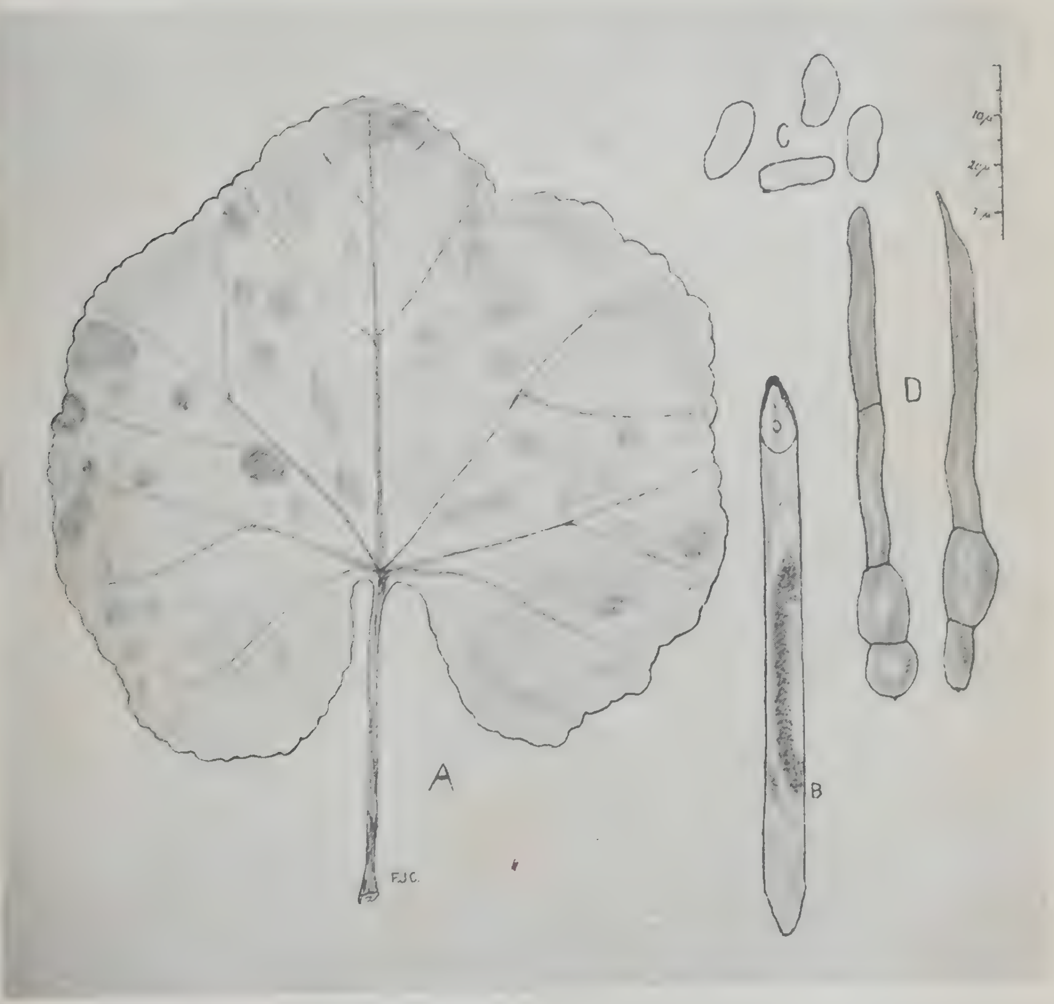

Fig. 81.—Colletotrichum malvarum.

A, Leaf of *Lavatera trimestris* with brown spots caused by the fungus; B, portion of stem with diseased spot; C, spores; D, bristles which cause the dark colour of the spots. (A and B slightly reduced, C and D greatly magnified.)

The first symptom of the disease is the appearance of small yellowish-brown spots on the upper surface of the leaves (fig. 81, A) and on the leaf stalks and stems (fig. 81, B), perhaps more particularly at the nodes, though not by any means confined to that part. Frequently the spots first appear a little above the base of the stem, but they are to be found in any part right up to the flower. The spots on the stem are usually much paler than those on the leaves, when they first appear.

The tissues around the spot are filled with the mycelium of a fungus and the cells attacked are killed. The spots rapidly enlarge, and on the leaves often run into one another. As the fungus spreads the tissues right through the leaf are killed, so that the spots are evident on the lower surface as well as the upper. On the stems the spots increase in size lengthwise more rapidly than in diameter, so that they soon assume an elongated oval form, sometimes reaching a length of two inches or more. As time goes on the tissues are killed completely round the stem, and subsequently the whole of the stem, above the spot attacked, wilts, turns brown, and dies. The spots become darker in colour and finally almost black, owing to the presence of numerous very dark brown stiff bristles (fig. 81, D) standing up from the diseased spots, among which the colourless spores (fig. 81, C) are produced in great numbers.

Several correspondents have stated that the disease has spread through and killed all the plants of this species in a garden, and it is certain that when it once appears its progress is rapid and the havoc it causes certain; furthermore it has not proved at all easy to combat.

The disease is caused by the fungus *Colletotrichum malvarum*, a species which was first noticed in 1854, and described by A. Braun and Caspary[*] under the name of *Steirochaete malvarum*. In 1890 Southworth,[†] writing of a new hollyhock disease, described the same fungus under the name of *Colletotrichum althaeae*, thus putting it in its proper genus, but overlooking the fact that it had been described previously under another specific name than *althaeae*, and under this name Massee[‡] and Cooke[§] refer to it.

Until 1906 it was unknown in this country, but in that year it was recorded as having been "collected by Mr. Wishart at Alyth, Perthshire, on a malvaceous plant,"[‖] and, as we have pointed out, it has since that time appeared in many parts of this country.

Eriksson found it in a garden in Stockholm on a species of mallow in 1883, and in America it has proved very destructive to hollyhocks. We have not yet seen it upon hollyhocks in England, but, as it has attacked them so disastrously in America, it is to be looked for upon them here. The symptoms of the attack on the hollyhock are similar to those described above.

Repeated sprayings with Bordeaux mixture, while they have checked the disease to some extent, yet have not sufficed to stop its progress completely. This fungicide is, however, the best that is available. Plants which show the symptoms of the disease should be destroyed by fire as soon as possible after its appearance. Where the disease has once occurred it has unfortunately reappeared in succeeding years, and it

[*] *Über einige neue oder weniger bekannte Krankheiten d. Pflanzen.* Berlin.

[†] *Journ. of Mycol.* vi. pp. 45 and 115.

[‡] *Textbook of Plant Diseases* (1899), pp. 290, 429.

[§] *Fungoid Pests of Cultivated Plants* (1906), p. 39, pl. ii. fig. 43.

[‖] *Trans. Brit. Mycological Society*, iii. p. 39.

would therefore be well to avoid growing the plants in places where it has occurred in the previous year. Although it has not so far been directly proved that the disease is conveyed in the seed, it would be best not to save seed from affected plants, particularly as the commercial "seed" is not only the seed proper, but is surrounded by a part of the old plant on which the fungus may often be found growing. Several of the plants recently examined showed pustules of the fungus, not only upon the flower, stalks, and calyx, but also upon parts of the ovary itself. If the mycelium should prove itself capable of withstanding the drying the "seed" undergoes, the source of infection is thus conveyed in the "seed." Even if this were not the case, it would be quite impossible, unless the "seeds" were treated with some disinfectant, to guarantee them free from adherent spores of the fungus which might well survive the winter and propagate the disease in the following season.

VII.—A DISEASE OF ANTIRRHINUM.

By F. J. CHITTENDEN, F.L.S.

In the summer of this year specimens of diseased Antirrhinums were received at the Laboratory from Devonshire. Nearly every plant in the garden from which they came was diseased, though they were planted in different aspects and in various kinds of soil.

The leaves of the diseased plants had numerous yellowish rounded spots upon them (fig. 82, A), and in some cases these spots were so numerous that the whole leaf was dead. In addition somewhat similar, elongated-oval dead spots were present on the main stem and its branches (fig. 82, B). In some instances the dead areas upon the stem passed quite round it, forming a girdle of diseased tissue, and then all above the diseased spot, being cut off from the water supply from below, died and dried up. The diseased plants therefore presented a very forlorn appearance, failed to flower, and in most cases soon succumbed to the attack.

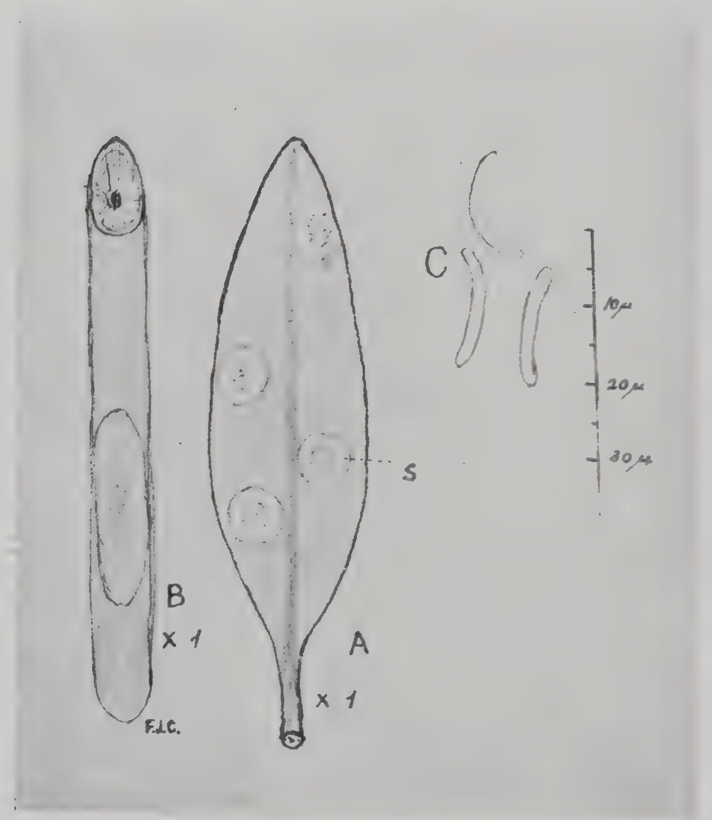

FIG. 82.—SEPTORIA ANTIRRHINI.
A, Leaf with pale spots (s) produced by the fungus; B, diseased spot on stem; C, spores of the fungus.
(A and B, natural size; C, much magnified, see scale).

The disease proved to be due to the attack of a fungus which has not previously been known to occur in Great Britain, though it is known in parts of Western Europe, having been recorded from France, Italy, and Portugal. It is evident that under certain conditions, if the fungus once gains a foothold, it is capable of causing very serious damage to these popular plants.

The genus *Septoria*, to which the fungus belongs, is a very large one and contains many species which do considerable harm in a very short time. Though the area killed by a single individual of the fungus is usually small, yet the spores are produced so rapidly after infection first takes place, and in such abundance, that the spread of the fungus is rapid, and the destruction of the whole plant in the case of such a plant as the Antirrhinum is a question of only a few days.

The fungus which is the cause of the disease is not known to attack any other species of plant, and has received the name of *Septoria Antirrhini* Desm.

Careful examination with a lens will reveal, scattered over the yellowish spots on the leaves and stems, exceedingly small darker spots. These are the fruit bodies of the fungus, and the spores, which are long and narrow (fig. 82, c) and thickly packed within the fruits, escape when ripe by a small pore at the apex. They can germinate at once provided moisture and a suitable temperature are available.

Since *Antirrhinum majus* has become naturalized in this country, particularly in the south, if the disease should spread it will probably prove very difficult to eradicate. Wild plants would serve as breeding grounds for the fungus whence it would continually spread to the cultivated ones. It would, therefore, be well to burn any plants that are attacked badly so as to destroy the spores completely and quickly.

As a means of protecting plants which have escaped, and the whole of the plants in a succeeding year, spraying with Bordeaux mixture or a solution of one ounce of potassium sulphide in three gallons of water should be resorted to. Where only small groups of plants are concerned hand sprayers may be used. Small, light and handy little spraying outfits, producing a very fine mist-like spray of just the kind suitable for such a purpose, may now be obtained. Where larger numbers are required to be sprayed a knapsack sprayer answers the purpose best.

As the fungus has not previously been found in this country a description is appended:

Septoria Antirrhini Desm.—Spots yellowish; perithecia on both sides of the leaf, very small, 50μ–70μ in diameter, rather prominent, numerous, crowded or scattered, with an opening at apex; spores cylindrical, obtuse, bent or curved, 4–7-guttate, one-celled, 15–$20\mu \times 2$–$2{\cdot}5\mu$. On leaves and stem of *Antirrhinum majus*.

THE INTRODUCTION OF ROSA BANKSIAE.

By E. H. WOODALL, F.R.H.S.

A CURIOUS fact concerning the Banksian Rose has this year come to light. The double white form of *Rosa Banksiae* was introduced to Kew in the early part of the nineteenth century, in 1815, but Wm. Kerr, according to a note in the *Botanical Register*, had it in cultivation as early as 1807. The double yellow was introduced some years later, and the single yellow only made its appearance about 1870. The typical form, the single white, remained unknown, though many inquiries were made for it in France, where these climbing roses abound in every garden in the Riviera, as well as in Italy and Switzerland. Four years ago I found a rose growing on the wall of Megginch Castle, Strathtay, Scotland, which seemed to me a very slender-growing form of *R. Banksiae*. Captain Drummond of Megginch told me it was a rose that his ancestor, Robert Drummond, had brought with other plants from China the year his brother, Admiral Sir W. Drummond, had cruised in the China seas, in 1796. This old rose had been repeatedly cut to the ground by severe winters, and rarely if ever had been known to flower. The impression, however, was that it was white and very small. Captain Drummond kindly gave me cuttings, which I took to Nice, and this year they flowered, proving themselves to be the typical single white Banksian rose so long sought for and hidden away in this nook of Scotland for more than a hundred years. The introduction of the Banksian rose, therefore, is due to Robert Drummond of Megginch, who brought it from China in the year 1796.

THE SWIFT MOTH CATERPILLAR AND DAFFODILS.

By H. R. Darlington, F.R.H.S.

> So secret and so close
> As is the bud, bit with an envious worm,
> Ere he can spread his sweet leaves to the air
> Or dedicate his beauty to the sun.
> Could we but learn from whence his sorrows grow
> We would as willingly give cure as know.
> *Romeo and Juliet.*

My object in calling attention to the attacks of the swift moth caterpillar (*Hepialus lupulinus*) on daffodils is twofold. I have found it extremely destructive in my own garden, and hope that a discussion of the matter may bring some useful suggestion of a means of effectively dealing with the difficulty; and I have reason to think that some who have suffered in the same way may welcome a discussion of the subject and take some interest in my observations, while it may assist others whose daffodils have failed from the same cause, though they have been unable to determine the reason of the failure.

I have no doubt that the destruction caused by this caterpillar is much more widespread than is generally known.* On two occasions, in different parts of the country where I have been assured, "Oh, we cannot grow daffodils here," I have found the grub in the immediate neighbourhood of the ground considered to be hopeless for the purpose. This may of course be a coincidence, but it is possible that if the cause of failure be as I suspect, by taking proper precautions the daffodil might be grown in those places where it has hitherto been found to fail.

The swift moth is unfortunately an extremely common moth. At the same time the books on British moths tell us very little about its habits and, so far as I am aware, nothing as to its partiality for the daffodil.

The life-history of the swift moth is somewhat as follows:—The moths appear towards the end of May and continue through June. The female is decidedly larger than the male. The colour in both cases is a dusky brown, but the wings are rather prettily marked with a pattern of a lighter colour. The male has a tuft of rufous-tinted down at the back of the thorax. The moths may often be seen flitting about the garden in the early dusk, with a peculiar zigzag flight, to which no doubt they owe their name. These are probably males, the females lying below at the roots of the grass. The females begin to lay their eggs early in June. I have often tried to observe the moth in flight, but down to the present I am unable to determine whether the female moth lays her eggs deliberately on particular plants or in particular places, or whether at haphazard as she flies. Whichever method is adopted it is usual to find several caterpillars hatched out close together. They may perhaps be hatched on the surface of the ground and then crawl down the holes left by the decaying foliage of the daffodil. I have, at all events, found the caterpillars in July in the scales of bulbs which had been dug from the ground in the middle of June. They were then, of course, very small, but had begun to feed on the bulb which was in process of being dried off.

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* When I first called attention to the pest (*Garden*, April 27, 1907), Mr. Blake of Guildford wrote to that journal (May 18) stating that out of 160,000 bulbs grown by him something like one third had been affected by it.

From July till the following May the caterpillars remain under ground feeding on various roots. I have read that they live on the roots of the dock.* I only wish they would confine themselves to so innocent and even laudable an amusement. Unfortunately any fleshy root seems to serve their purpose. Beside the daffodil and the dock, I have found them attacking the roots of the paeony, the tulip, the colchicum, the lily, the pentstemon, *Chelone barbata*, and on one occasion apparently the young roots of the hawthorn. Of the paeony they seem to be specially fond.

They appear to be liable to be attacked in return by a curious fungus which will kill them, and they may then be found dead, slightly orange in colour, hard, and rather brittle.

When they feed on the daffodil they seem, as a rule, to prefer to eat the roots and the bulb rather than the shoots. Sometimes the caterpillars will eat the roots right away, and also bore into the bulb, in which case the plant will either die altogether or push up a few miserable leaves; and is practically ruined. In other cases the roots may be scarcely touched and the bulb only attacked; the plant will then throw a feeble growth of leaves, seldom a flower. If a fork be inserted under the bulb noticed to be in this condition, and the whole thing dug up, the caterpillar may sometimes be dug up with the bulb, its head buried deep in the base of the bulb. This is, however, not always the case, and perhaps on account of the depth at which they generally work, it is not easy to find the marauder, even when one feels fairly confident that an attack is in progress, and though the bulb when lifted may give positive evidence of having been subject to attack.

But the caterpillars will also sometimes eat the shoots as well as the roots and bulbs, and in such cases of course no leaves will appear above ground, and when the bulbs are lifted they will be found to present the appearance of concentric circles of bulb scales, both the top and base of the bulb having been eaten right away.

It is, however, very unusual to find this, and I have noticed it only on two occasions. In both cases about ten or a dozen bulbs enclosed in a small partition on the rockery were attacked, and I suppose the caterpillars were numerous and unable to make their way to fresh bulbs after they had consumed the parts of the plants they liked best. In one case the daffodils so completely destroyed consisted of a group of 'Vesuvius,' and in the other of 'Queen of Spain.'

In all cases that have come under my notice bulbs attacked by the swift moth caterpillar, when subsequently lifted and examined, present quite a different appearance from bulbs which have been attacked by the grub of the narcissus fly. The narcissus fly lays its egg in the foliage, and the grub which hatches out makes its way into the centre of the bulb, which it completely destroys, and ultimately it eats its way out, though it is occasionally found in the middle of the bulb when it has been lifted and dried off. There is nearly always found a hole from the base into the centre of the bulb, and sometimes another hole out on to the shoulder of the bulb.

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* Morris states generally that they feed on the roots of plants.

In a bulb attacked by the caterpillar one or more holes are seen to have been bored into the bulb, generally into the base; but the holes are not deep, and it is usually easy to see that they do not extend into the centre of the bulb. More rarely it may be found that a considerable part of the base of the bulb has been eaten away in an irregular patch. In either case the havoc wrought on the plant is sufficient to impair its vitality seriously and often to destroy it as effectually as though it had been visited by the narcissus fly. Apparently the caterpillar, having eaten a certain distance into the bulb, leaves that spot and begins again at a fresh place or on another bulb.

This method of attack was particulary noticeable in the case of some colchicums, the smooth bulbs being pitted all over with little holes about a quarter of an inch deep. But the colchicum bulbs were not very seriously injured by the treatment, the bulb being, as it were, merely a storehouse for reserve material, and the growing shoot produced from the side of the bulb was not generally affected.

The caterpillar when full grown is about one inch in length. The body is white and the head brown in colour.

In the spring it makes its way to the surface of the ground and spins itself a cocoon. This proceeding begins in April and continues through May into the early part of June. The earliest date on which I have found a caterpillar spinning its cocoon is April 15, and the latest during the first week of June; but by the middle of May most of the caterpillars have turned into chrysalides, and may be found a few inches below the surface.

The chrysalis is of a yellowish chestnut colour, usually about seven eighths of an inch long and three-sixteenths of an inch in diameter, and when disturbed it wriggles a good deal, a habit which often leads to its detection. It is, however, not always easy to find the chrysalides in the soil, even when the condition of the plants raises a suspicion of their presence, and a careful search is made, and although the subsequent finding of the empty shells shows they have in fact been there, and have escaped discovery.

The chrysalis stage continues for about three weeks, and the insect then wriggles to the surface and the moth escapes. I have some reason to think that this stage may be slightly shorter in bright warm weather than when it is cold and damp, but the difference is not very great. The hatching out of the moths commences towards the end of May and continues through June. The female moth is nearly an inch and a half across the expanded wings, and just under an inch in length of body, the abdomen being of approximately uniform thickness. The male is one inch and an eighth across the wings, and five-eighths of an inch in length of body, the abdomen tapering towards the tail, and being only about half the thickness of the larger moth and slightly darker in colour.

The moths are seldom to be seen flying during the day. So far as my experience goes, the only occasion on which they appear during daylight is when a bed is being disturbed in getting up daffodils for harvesting, and the moths have been reposing on the earth, and endeavour to escape. They come out, however, towards dusk, and may then be seen flying over the garden with their peculiar zigzag motions. Their active operations seem confined to a couple of hours before and after sunset.

The long period over which the swift moths hatch out makes it rather difficult to devise methods for resisting the attack or for destroying the enemy. I will, however, mention the methods I have myself tried in the hope that others may be able to suggest more effective means of preventing or escaping from the evil.

From the time when the caterpillar begins to approach the surface for the purpose of spinning its cocoon until the time when the moth hatches out from the chrysalis, that is to say, from the middle of April till the beginning of June, the insect is close beneath the surface, and may be sought for in the ground and destroyed. For this means to be at all effective the whole of the beds must be very carefully gone over and the soil moved and scrutinized to the depth of six inches and the operation repeated at intervals of ten days or a fortnight—a method obviously impracticable in the ordinary border.

It is also possible, though difficult, to catch the moths themselves when flying in the dusk, but these are generally males. I fear neither method will do more than mitigate the evil. I am told the moth is not one of those that can be caught by sugaring the stems of trees, or which is attracted by a bright light. I have not found the method of searching the ground for the females very successful. I have so found them only by accident.

It is an unfortunate coincidence that the time of the caterpillar's greatest destructive activity is precisely that of the principal root-growth of the daffodil—namely, from August till April—and during this period the creature is at work so deep in the soil, that it cannot be sought for without serious injury to the roots and bulbs we are trying to protect. I have tried the plan of surrounding the bulbs with sharp, gritty substances, such as fine charcoal and ground oyster-shell; but this proved quite a failure, and did not in any way prevent an attack.

Then came vaporite apterite, killogrub, and similar remedies. It is possible I may yet find an effectual way of using these substances, and I am not prepared to say that they are wholly without effect—my gardener thinks they do produce some result—but no method I have yet tried of applying them can be said to provide a complete remedy for the evil in the case of daffodils left in the ground and not lifted. In one small bed which had vaporite dibbled in between the bulbs in the autumn and again in the spring about one-half the plants were attacked, and I was able to discover some ten or a dozen of the caterpillars or chrysalides in the following May.

If these substances produce their effect by means of a gas which they give off, and which acts chiefly in an upward direction, it is easy to understand the difficulty in getting the dressing, which has to be inserted by means of the dibble, placed sufficiently deep to destroy the grubs when feeding below the bulbs, and this may account for the failure of the autumn dressing; but it was nevertheless disappointing to find that the spring application seemed to produce little or no result on the grubs when they began to come to the surface for the purpose of entering the chrysalis state. I have no doubt that vaporite will kill the caterpillars in certain conditions; for instance, if a few caterpillars be collected and placed in soil in an ordinary garden flower-pot a little vaporite added to the soil very soon kills them, but it is a different matter in the open, and I must admit my impression that this treatment has not proved an effectual remedy down to the present.

Mr. Ellis has suggested to me that scattering vaporite or some smelling substance over the daffodil beds in June may possibly scare away the females from the beds, as he thinks they generally descend to the ground to lay their eggs. I have not yet tried this method.

A device I have tried with a certain amount of success is to cover the the beds in which the daffodils are growing in the middle of May with a rough framework, and over this to stretch a wasp-proof fabric. Where this can be done it seems to afford sufficient protection, provided two precautions be observed. The first is to take care that the fabric is fastened close to the ground. Where this has not been carefully attended to I have found bulbs near the edge of the bed to suffer, though even then the attack has never proved a serious one. The second is to examine the bed very diligently in order to make sure that none of the enemy is present in the bed at the time the cover is placed in position. In this connexion it is to be observed that the presence of one or two only of the grubs may cause but small damage; no bulb may have failed to come up, and perhaps only one or two may have been without a flower, or shown some other sign of weakness. In such case any symptom of weakness must be regarded as a grave cause of suspicion. The soil must be most carefully moved and examined within a circle of about 18 inches round each plant showing signs of weakness to a depth of 6 inches at least, and the operation repeated a week later, after the covering has been put on. The covering has to be left on until the end of July. I need hardly say that this method, though fairly successful, if carried out as I have described is very inconvenient, and can only be resorted to in a place devoted solely to daffodils, and is quite impracticable in the ordinary border. It has, moreover, the additional disadvantage that it has the effect of keeping the ripening influence of the sun away from the plants just at the time when it is most beneficial to them. I think the use of this method of covering from the middle of May till the end of July is likely to be confined in practice to a few cases of rare or valuable bulbs which for some reason it is desired to retain in the ground for two or more years without lifting.

Somewhat reluctantly I am coming to the conclusion that in all probability the most effective way of outmanœuvring this troublesome pest is by resorting to an annual lifting of the bulbs accompanied by a very careful inspection before replanting. Where this has been carried out and the precautions next mentioned observed I have never, down to the present, found serious trouble to result. But in addition to the examination of the bulbs I think two other precautions should be taken. One is that the ground should be thoroughly well worked before planting takes place, and the other is that ground which has been subjected to a bad attack should not be again used for daffodils for at least a year after the affected bulbs have been removed.

The only case I can recall in which freshly planted bulbs have been seriously injured occurred when I planted a batch of 'Maurice Vilmorin' in a spot in a mixed border from which the remnants of a group of 'Flora Wilson' had been taken up a month or two before. The latter had been almost destroyed during the previous year. The position selected was in the middle of a mixed border: it had not been found practicable to effectively work the ground after the affected bulbs were taken away, and no doubt the caterpillars when hatched out found subsistence on the roots of other plants until they discovered the newly planted daffodils.

If I am right in thinking that annual lifting of the bulbs and working the ground carefully before replanting affords a means of avoiding the troubles caused by the pest, this may perhaps explain why so little has been heard of the caterpillar before this. Nurserymen are from the necessity of their business in the habit of practising both these precautions, as well as of carefully cleaning their bulbs before sending them out, and so the large growers may have escaped being affected by the moth.

I have arrived at this conclusion with reluctance, because, in the first place, the annual lifting of all the daffodils, even where only a moderate number of plants are grown, is rather a serious undertaking and an uncomfortable disturbance of the borders; and besides this I think that many daffodils seem to produce their best blooms only if they are allowed to remain in the ground for two or three years without any disturbance.

However this be, so far as my experience goes down to the present the annual lifting and replanting seems the most effective way of combating the evil I have described.

I am indebted to Mr. Henry Ellis for identifying the moth and for making many suggestions.

AMARYLLIS PARKERI.

[*A. Belladonna* var. *blanda* × *Brunsvigia Josephinae*]

By A. Worsley, F.R.H.S.

This bi-generic hybrid should be of great interest to those who study genetics, because the parents are so very dissimilar that we are presented with no less than 17 divergent characters to work on, and the fact that the hybrid is self-fertile will enable the subsquent generations to be analysed. Moreover the history of the hybrid is fully ascertained, and the reverse cross has been raised and flowered.

In reference to the interesting notes published in the "Gardeners' Chronicle," vol. xlv. (1909) pp. 37, 92, by Messrs. C. G. Van Tubergen. junior, Mr. W. Watson, and Mr. H. J. Elwes, I would note that it cannot be said in the same breath both that the Kew form of *A. Parkeri* may possibly be the progeny of the original cross made by Herbert, and also that Messrs. Van Tubergen's cross may differ therefrom *because* it is the reverse cross to that made by Herbert. This may be true of the *A. Parkeri* raised by Mr. Parker, for this was raised on *A. Belladonna*, but Herbert's hybrid was raised[*] the same way as Messrs. Van Tubergen's—that is, on *Brunsvigia*—the only difference being that Herbert's male parent was the var. *A. blanda* (now lost).

Amaryllis blanda × *Brunsvigia Josephinae* = *A. Parkeri.*
(17 divergent parental characters.)[†]

Bulb.	*a*—thin tunics.	*A*—stouter tunics.
	b—proliferous.	*B*—non-proliferous.
	c—spherical.	*C*—conical (8 inches to 10 inches high).
Foliage.	*d*—forming a pseudo-stem.	*D*—strictly radical.
	e—narrower ($1\frac{1}{4}$ to 2 inches).	*E*—wider ($1\frac{1}{2}$ to 3 inches).
	f—glabrous.	*F*—rough and dull surface.
Inflorescence.	*g*—flowers facing one way only.	*G*—flowers facing in all directions.
	h—flowers not bent downwards.	*H*—flowers bent downwards.
	j—hyacinth-scented.	*J*—inodorous.
	k—span of flowers $4\frac{1}{2}$ inches.	*K*—span of flowers $2\frac{1}{2}$ to 3 inches.
	l—span of umbel 9 inches.	*L*—span of umbel 36 to 42 inches.

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[*] *Vide* Herbert, *Amaryllidaceae*, p. 278.

[†] In the table the small letters indicate the character of the seed parent, the capitals those of the pollen parent.

	m—pedicels short (less than three inches).	*M*—pedicels long (12 to 18 inches).
	n—flowers few (5 to 13).	*N*—flowers many (17 to 40).
	p—whitish or blush-pink above.	*P*—purple-red to brick-red above.
Fruit.	*q*—spherical.	*Q*—bull-headed and lobate.
	r—seeds semi-transparent, pearly white or rosy.	*R*—seeds green, opaque.
	s—reaches flowering stage in England in about 6 years.	*S*—reaches flowering stage in England after 25 years or more.

In these 17 divergent characters the hybrid followed the male in 1 only, the female in no less than 11, and was equipoised in the remaining 5 characters. The formula is—

$$abcd\frac{eE}{2}fGhjk\ \frac{lL}{2}\ \frac{mM}{2}\ \frac{nN}{2}\ \frac{pP}{2}\ Qrs^{*}$$

This hybrid is fertile, and I have twice raised self-fertilized seeds upon it, and have seedling plants now growing none of which show any great divergence from the hybrid type in their bulbs or leaves.

In examining the hybrid characters in which the blood of the male parent is evident, it so happens that in most of them the only evidence is in increased size and in number of flowers: just those characters that are influenced in so many cases by generous treatment and the appearance of which do not necessarily presuppose hybridization. Again colour is often variable, and much depends upon the structure and temperature in which the plants are grown. So that the only strong evidence in favour of hybrid origin is in the changed structure of the umbel, which has become regular instead of irregular. Hence Mr. Baker did not feel justified in citing this plant as of hybrid origin when it was first presented for determination at Kew. Moreover, at that time much uncertainty surrounded the traditionary origin of the plant, and no authority could be traced for any definite parentage. But since then evidence has been gradually accumulating. The two genera have been recently crossed in at least three different gardens—and not only so, but the reverse cross has also been made by Messrs. Van Tubergen, junior, of Haarlem, and has produced a not very dissimilar hybrid. All that now remains to be done is to analyse the second generation of self-fertilized hybrids so as to determine the mutations.

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* As all the individuals I have seen in flower are presumably offsets from one plant, there is practically no variation from this formula among them. But doubtless the formula will vary in other individual hybrids.

THE DARWIN CENTENARY.

The Centenary celebration of the birth year of Charles Darwin was held at Cambridge on June 22, the date coinciding with the fiftieth anniversary of the publication of his "Origin of Species." The Royal Horticultural Society, among other scientific societies, was invited by the University of Cambridge to send a representative to take part in the festival, and the Rev. Professor George Henslow, M.A., V.M.H., was appointed to represent the Society.

The following is the text of the Address presented from the Society to the University by Professor Henslow, and appended is his account of the proceedings at the festival:—

Royal Horticultural Society,
Vincent Square,
Westminster, S.W.

On our own behalf, and on behalf of the Fellows of the Society (numbering 10,500), we, the President and Council of the Royal Horticultural Society, send Greeting to the Chancellor and Senate of the Ancient University of Cambridge, on the occasion of their celebration of the Centenary of the birth of Charles Darwin and of the Jubilee of the publication of his great work "The Origin of Species."

Our Society recognizes quite as fully as the University the vast impetus given to Biological Research by the laborious, painstaking, and original investigations undertaken by Darwin. We recognize, also, the peculiar indebtedness of Horticulture to this great Student of Nature, who, by the publication of his own researches and thoughts, fixed the idea of improvement by way of gradual development in the minds of thousands of gardeners, and thus set in motion a vast mass of independent investigations which, even if they have not always confirmed Darwin's theories, have led to a greatly increased knowledge of some of the laws which contribute to the production of improved forms of plants.

Nor can we forget the enormous debt which the horticulturists and botanists of the whole world owe to Charles Darwin for the legacy which he left at his death for the production of the work which we now know as "Index Kewensis"—a work which has simplified incalculably the labour of all future investigations in dealing with species.

And we feel ourselves particularly happy in being able to send this, our Address, by the hand of Professor George Henslow, M.A., V.M.H., F.L.S., etc., who is not only so well known by his own abundant work in the realm of plant-life, but also bears a name revered by all disciples of Darwin, who, in his undergraduate days, was known as "the man who walks with Henslow" (the father of our present Delegate), and whose appointment to the "Beagle" was made on Henslow's nomination. He also took charge of, and arranged, the collections which Darwin from time to time sent home, and of whom Darwin himself writes: "I owe more than I can express to this excellent man . . . my attachment to natural history, I owed in large part to him."

In token of this our Brotherly Greeting we have caused the Seal of our Society to be set hereto this 6th day of April in the year of our Lord 1909.

TREVOR LAWRENCE, *President.*
(SOCIETY'S SEAL.) W. WILKS, *Secretary.*

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The great Darwin celebration will long live in the memories of all who took part in it. Almost every British scientific institution of importance, the Colonies, and many foreign countries were represented. The delegates numbered 248, distributed as follows:—

BRITISH ISLES.—79.

FOREIGN COUNTRIES.—Germany, 30; United States, 28; France, 15; Italy, 11; Austria-Hungary, 10; Sweden, 8; Russia, 7; Holland, 6; Belgium, 5; Switzerland, 5; Portugal, 3; Denmark, 2; Japan, 2; South America, 1; Greece, 1; Norway, 1; Spain, 1; Java, 1; Egypt, 1.

THE COLONIES.—India and Ceylon, 8; Canada, 7; Australia, 6; New Zealand, 6; Cape Colony, 3; Straits Settlements, 1.

The first event on the three days' programme was the Reception of the Delegates and other invited guests by the Chancellor of the University (Lord Rayleigh, O.M., F.R.S., D.Sc.) in the FitzWilliam Museum.

Academic robes and orders were worn, and the former consisted of innumerable varieties of forms and colours, and with the accompaniment of the bright dresses of a large assemblage of ladies formed a picturesque scene which could not be paralleled.

After being received by the Chancellor at the head of the magnificent marble staircase, the company passed into the picture galleries, which were soon filled. By the kind permission of the Master and Fellows of Peterhouse, the college gardens were accessible from the museum. They were illuminated by Chinese lanterns and coloured lamps, and were much enjoyed, as the weather (both on the 22nd and 23rd) was all that could be desired.

On Wednesday, June 23, the presentation of Addresses by the Delegates took place in the Senate House. The proceedings commenced with a short Address by the Chancellor, who, in the name of the University of Cambridge, welcomed the guests who had willingly responded from all parts of the world. "Indeed, the occasion was no ordinary one. They had met to celebrate the Centenary of the birth of Charles Darwin and the fiftieth anniversary of the publication of 'The Origin of Species.' He was old enough to remember something of the stir caused by the latter event. To many the results of Darwin's speculations were unwelcome, and probably remained so, at least in their application to the origin of man. Fifty years ago it would have seemed a bold prophecy to predict that day's celebration. They might perhaps take it as proving that Cambridge was not held so fast in the bonds of Medievalism as some would have them suppose. They were prepared to face whatever strict methods of investigation might teach to be the truth. He need not remind them that on many important questions raised by Darwin's labours opinions still differed, and he imagined that Darwin would hardly recognize as disciples some of the distinguished biologists who were met to do honour to his name. But what appealed to all was the character of the man, loved by everyone with a spark of the scientific flame. It was a pleasure and a stimulus to think of him working on in spite of ill-health in his study, his garden, and his hothouses; and from his retirement moving the minds of thinking men in a manner almost without parallel. He was struck, as were others, with Darwin's wonderful modesty. This characteristic remained to the end. During the last generation Cambridge, especially since the time of Michael Foster, had been active in biological work. At the present time it was desired to establish a chair of Genetics, a subject associated with the name of Darwin and of his relative Francis Galton, and of the greatest possible importance, whether it be regarded from the purely scientific or from the practical side. He would like to think that the interest aroused by the celebration would have a practical outcome in better provision for the further cultivation in Darwin's own, and his son's, University of the field wherein Darwin laboured."

After the Addresses had been presented by all the foreign delegates, Professor Oscar Hertwig (Berlin) and Professor Metchnikoff (Paris) delivered short Addresses as representatives of the Continent of Europe. Professor Hertwig regarded Cambridge as the centre of Darwin's influence, and referred to the immense effect of Darwinian thought upon the minds of German scientists. Professor Metchnikoff similarly described the effect and extent of Darwin's teaching in France.

After the delivery of these two short speeches, the presentation of Addresses from the British Colonies and British Isles followed. Professor H. F. Osborne (President of the American Museum of Natural History, New York City) then rose, and paid a tribute to the University of Cambridge. "To no other institution in any country," he observed, "could they turn with such a sense of filial gratitude. . . . Through John Harvard of Emmanuel, Cambridge became the mother of their colleges. . . . Noble offspring, too, of the many pious foundations of the old University, of Trinity, of Christ's, were the great men such as Harvey, Newton, Clerk-Maxwell, Balfour, and, above all, Darwin. . . . To them Darwin, more perhaps than to any other naturalist, seemed greatest in the union of a high order of genius with rare simplicity and transparency of thought. Dwelling on this lucid quality and on the vast range of his observations, from the most minute to the grandest relations in nature, did not the image arise of a perfected optical instrument, in which all personal equation, aberration, and refraction was eliminated, and through which, as it were, they gazed with a new vision into the marvellous forms and processes of the living world? With this wondrous lens their countrymen, Cope and Marsh, penetrated into fossil life. Then the arid deserts of the Rocky Mountains gave up their petrified dead as proofs of Darwinism." At the conclusion of an eloquent panegyric of Darwin, the speaker said the American delegates, naturalists, and friends desired to present to Christ's College, as a memorial of their visit, a portrait of Charles Darwin in bronze, the work of their countryman, William Couper, a portrait which they trusted would convey to this and future generations of Cambridge students some impression of the rugged simplicity, as well as of the intellectual grandeur, of the man they revered and honoured.

Sir E. Ray Lankester concluded the proceedings by speaking on behalf of the naturalists of the British Empire. His main contention was that "in the judgment of the large majority of British naturalists, after fifty years of examination and testing, Darwin's 'Theory of the Origin of Species by means of natural selection, or the preservation of favoured races in the struggle for life,' remains whole and sound and convincing in spite of every attempt to upset it."

In the afternoon of the 23rd a garden party was given by the Master (Dr. Peile) and Fellows of Christ's College in the college grounds. In the first court, in which his rooms were open for visitors, was also a collection of portraits, prints, and writings of Charles R. Darwin. A printed catalogue described 257 objects, mainly supplied by his children. The fine portrait by Hon. John Collier was lent by the Linnean Society.

In the evening the great banquet to the delegates was held in the New Examination Hall of the Museums building. Nearly 500 guests were present. The toast of the evening was proposed by the Rt. Hon. A. J. Balfour, as well as Dr. Svante Arrhenius, the head of the Nobel Institute at Stockholm. The Chancellor (Lord Rayleigh) was of course in the chair, being supported by the Vice-Chancellor (the Master of Pembroke), Prince Roland Bonaparte, the Rt. Hon. A. J. Balfour, the Duke of Northumberland, Sir Archibald Geikie, and other distinguished men.

After the usual loyal toast "The King," the Right Hon. A. J. Balfour, M.P., rose to propose a toast "In Memory of Charles Darwin." He began by remarking that he "was conscious of but two qualifications which he possessed for the task. The one was the deepest personal affection and the most unstinted admiration for Darwin; and the second was that he yielded to no man in his loyal devotion to the University of which Charles Darwin was one of the greatest ornaments." He then reviewed the progress of science in the direction of physical origins. Turning again to Charles Darwin he observed that "he had become part of the common intellectual heritage of every man of education, wheresoever he might live or whatsoever his occupation in life. The fact remained that to him they traced—perhaps not to him alone, but to him in the main—a view which had affected not merely our ideas of the development of living organisms, but ideas of politics, ideas upon sociology, ideas which covered the whole domain of human terrestrial activity." Alluding to his personal qualities, the speaker contributed his quota to Darwin's well-known traits by saying:

"He was sure he was not in the least going beyond the bare naked truth when he said that, quite apart from his great scientific achievements, there never was a man, never lived a man, more worthy of respect and more worthy of love than this great naturalist." He concluded with the words: "He was above all a man whose heroic disposition and whose lovable qualities would, even if he had not otherwise gained that immortal niche in the temple of fame, still commend him to every man who either knew him personally or who by tradition had been able to form some estimate of the rare qualities which he exhibited."

Dr. Svante Arrhenius also spoke to the toast. After alluding to the ideas of Evolution entertained by the Hindoos, in Egyptian legends, Ovid's "Metamorphoses," and elsewhere in antiquity . . . "the epoch-making word was delivered by Charles Darwin in his 'Origin of Species.'" He concluded an eloquent speech with the words: "In this veneration of Darwin's memory all men of science regarded him not only as an ideal man of science, but as a man of science whose power and influence had been enhanced by his integrity and moral worth."

The toast was drunk in silence.

Mr. W. Erasmus Darwin responded in an admirable reply, dealing more especially with his father's private life in connection with his family, of which he gave his own reminiscences, which added to the well-known character affectionate traits not usually mentioned in the literature of his life. Another trait was his father's horror of anything like cruelty, and he spoke of occasions in which he took an active part in suppressing it.

Professor Poulton, of Oxford, proposed "The University of Cambridge," and the Vice-Chancellor replied.

On the third and last day Honorary Degrees were conferred on twenty-one of the delegates. The Public Orator, Dr. Sandys, introduced each of them, recounting in Latin the various services they had rendered to science, for which they were to receive the degree of D.Sc.

Subsequently Sir Archibald Geikie delivered the Rede Lecture on "Darwin as a Geologist."

BOOK REVIEWS.

"The Face of the Earth." By Eduard Suess. Translated by Hertha B. C. Sollas under the direction of Prof. W. J. Sollas. With numerous maps and illustrations. 3 vols. 8vo., pp. xii + 604; vi + 556; vii + 400. (Clarendon Press, Oxford, 1904, 1906, 1908.) 25s., 25s., 18s., net.

Science among English speaking peoples owes an enormous debt to the delegates of the Oxford University Press for the admirable translations of standard works in foreign tongues which are published from time to time by them. That debt has been greatly increased by the publication of Prof. Suess' classical work, *Das Antlitz der Erde*, done into English by Miss Hertha B. C. Sollas under the direction of Prof. Sollas, Professor of Geology in the University of Oxford. Three volumes lie before us teeming with interest to all who would learn something of the structure of the earth on which we live and of the manner in which it has been built. Many, perhaps, bearing in mind the great amount of work done by slowly or swiftly moving water acting over long periods, and of other slowly acting agents gradually changing the face of the earth, have neglected to consider these enormous forces which must have been at work leading to the making of tremendous mountain chains with their contorted and displaced strata. That deficiency the present work makes good.

The first part of the book (to p. 179) deals with the movements which have taken place in the outer crust of the earth and the causes which have brought them about—with deluges, those great floods of which legendary history so often speaks, and which in times of great seismic disturbances must frequently have reached huge proportions compared with those of which we have distinct historical records—with dislocations causing through various pressures, folding of strata, over-thrusting and such like—with volcanos and with earthquakes. Then follows a series of descriptions of the various mountain ranges of the world and their history sketched by the hand of a master; and then a long discussion of the changes of form which have taken place in the surface of the sea. The fourth and last part, "The Face of the Earth," summarizes the preceding parts and "brings into relation the terrestrial changes which are deduced from them, with the changes which have taken place among the terrestrial faunas of the Northern Hemisphere since the beginning of the Tertiary period."

In such a work as this, parts of course, through the march of exploration, get out of date, but all the great discoveries in Africa and Central Asia, etc., which became available during the progress of the work are incorporated in it and, except, perhaps, for extended knowledge of the Antarctic Continent and the bed of the Oceans, investigations which are being pushed forward rapidly, the different parts of the work are only likely to need some modification in detail.

The translator and editor have interpolated nothing in the text, and for this abstention they deserve our thanks, for the result has been to give us a master's conclusions based upon comprehensiveness of detail and an accuracy of observation such as one man is rarely able to combine, in English singularly free from that Teutonic form which is so difficult to avoid in translating from the German. The result is a work which every geologist must read and the conclusions in which he must weigh with all due care and reverence. The maps, plates, and other illustrations —many of the last woodcuts—are admirable.

"Mendel's Principles of Heredity." By Professor W. Bateson, M.A., F.R.S., V.M.H. 8vo., 396 pp., 3 portraits, 6 plates, 23 figs. (University Press, Cambridge, 1909.) 12*s*. net.

This volume must be considered as the best and most authoritative text book of Mendelism that has yet been published.

It contains a short biography of Mendel and translations of the two important papers (on Hybridization and on *Hieracium*) upon which the whole structure of Mendelism is founded. There is a long bibliography and a summary of the various characters (61 pairs) which have been the subject of experiment. Some of the chapters, such as those on compound characters, on heredity and sex, on double flowers, and on heredity in man may interest horticulturists, but the most important in this respect are the five chapters entitled "Heredity in Colour" and the one on "Practical Applications."

By way of showing the importance of breeding from the first crosses the author gives a beautiful plate illustrating the extraordinary variations in the second generation in the case of two strains of *Primula sinensis*. The first cross was a dull and uninteresting flower, but in the second generation many of the blooms were richly coloured and showed interesting variations. The rest of this chapter deals with breeding from single seeds and with precautions against insect pollination.

There are full accounts of those valuable experiments of Miss Saunders and Miss Wheldale which have greatly advanced our knowledge of flower-colours. It would be gratifying to know if other experiments are being carried out not so much in support of Mendelism as to increase our information on this important subject. There are also the interesting experiments of Prof. Bateson himself, who found that a richly coloured sweet pea of the "Purple Invincible" type resulted from a cross of two white sweet peas both entirely without colour. We have not discovered any reference to Mr. Hurst's experiment with Golden Queen and Fireball tomatos which is one of the clearest and most interesting in this connection.

On the other hand, Mr. Hurst's suggestion that the "presence of something" is usually the *dominant* and its absence the *recessive* character is, as we are glad to observe, frankly accepted by Prof. Bateson.

It is not too much to say that for all who are interested in the hybridizing of flowers, these chapters on colour are of the first importance.

But it is at least probable that those who try to understand and appreciate them, must be prepared for severe mental exercise, for

Prof. Bateson is a convinced and thorough Mendelian and his terminology is formidable. The work would surely have been not only more useful but more lucid and even more thoroughly scientific if Prof. Bateson had translated his heterozygotes and allelomorphs into the simple English language. Had he done so, he would have avoided certain scarcely justifiable expressions regarding Prof. Pearson and the Biometricians, and might then have been not only more lucid but less rash in his conclusions.

Thus it is not, for instance, obvious to the ordinary mind that colour-blindness must be always inherited through the mother, even although in thirty-eight cases the sons of colour-blind fathers possessed normal sight. Then again we find on page 127 "whereas in all cases of sensible allelomorphism, the number of classes is three only, two being homozygous and one heterozygous."

There is nothing new in the idea that children may inherit one special characteristic from either father or mother or in a blended form from both parents. Even in ordinary cases, such as that of the Bassett Hounds, it is certainly not one pair of characters but a great number which are in question. These may be independent or they may be correlated in many intricate ways.

The author's own formula (given on p. 60) is not very clearly stated but it is enough to show that even with only twenty pairs of characters the types amount to so portentous a number that they become quite unworkable in practice.

"Darwin and Modern Science." Edited for the Cambridge Philosophical Society and the Syndics of the University Press, by A. C. Seward, Professor of Botany in the University. Five illustrations, 8vo., 595 pp. (University Press, Cambridge, 1909.) 18*s.* net.

The centenary of the birth of Charles Darwin and the fiftieth anniversary of the publication of the "Origin of Species" has been fittingly commemorated by the production of this interesting and valuable book. The Cambridge Philosophical Society, and the Syndics of the University Press have certainly been excellently advised in adopting this method of signalizing a great scientific landmark.

The volume consists of twenty-nine essays written by distinguished foreigners, Cambridge men, and a few others. There is first an introductory letter by Sir Joseph Dalton Hooker. The other articles are as follows:—

"Darwin's Predecessors," by Professor T. Arthur Thomson (Aberdeen). No one interested in the history of evolution can afford to neglect this contribution, which is one of the most valuable in the whole volume. It is full of information not easily obtained, and written in a clear and interesting manner.

"The Selection Theory," by Professor August Weismann, contains much that is new and unexpected. We cannot resist quoting in full the following prescient passage. "Thus everything which we can see in animals is adaptation, whether of to-day or of yesterday or of long gone by; every kind of cell, whether glandular, muscular, nervous, epidermic or skeletal, is adapted to absolutely definite and specific functions, and every organ which is composed of these different kinds of cells contains them in the proper proportions, and in the particular arrangement which best serves the function of the organ ; it is thus adapted to its function."

"Variation," by Professor Hugo de Vries (Amsterdam), is of course concerned chiefly with mutants and fluctuations, and with the external and internal causes of variability. He also insists upon the importance of breeding from single seeds, especially in the case of cereals.

"Heredity and Variation in Modern Lights," by Professor W. Bateson. This paper is for the most part Mendelian. The author goes so far as to say : "In the experimental methods which Mendel inaugurated we have means of reaching certainty with regard to the physiology of heredity and variation upon which a more lasting structure may be built." We think that the author has elsewhere withdrawn the statement (on p. 93) with regard to inheritance of colour-blindness.

"The minute Structure of Cells in Relation to Heredity." Professor Edward Strasburger (Bonn) in this brief but lucid article sketches the chief modern discoveries in cell-theory. He also shows that Darwin's idea "that invisible gemmules are the carriers of hereditary characters and that they multiply by division has been removed from the position of a provisional hypothesis to that of a well-founded theory."

"The Descent of Man," by Professor G. Schwalbe (Strassburg). This article is an appreciation of Darwin's book in the light thrown upon the subject by modern researches. There is, however, a short account of the possible ape-like progenitors of mankind.

"Darwin as an Anthropologist," by Professor Ernst Haeckel (Jena) consists also mainly of an appreciation of Darwin's work. There is some severe criticism both of Weismann and of De Vries, but the works of Roux and Semon are highly praised. Professor Haeckel also gives full details of his present views on the subject.

"Some Primitive Theories on the Origin of Man." In this article Mr. T. G. Frazer gives a very readable and valuable account of the theories of savages on this important subject. Some tribes, according to the author of "The Golden Bough," are crude evolutionists whilst others uphold Genesis.

"Darwin and Embryology." The theory of recapitulation is, according to Professor Sedgwick, still without satisfactory proof. All organisms possess the property of reacting to the environment and of undergoing a change which alters the relation of the organisms to the old environment and places it in a new one.

"The Palaeontological Record as Regards Animals" is not so hopelessly incomplete as Darwin believed, according to Professor W. B. Scott (Princeton). The genealogy of elephants, of the rhinoceros family, of whales, and of the inevitable horse are all described in detail.

"The Palaeontological Record for Plants" is by Dr. D. H. Scott. This is really the story of the successive ascendency of a series of dominant families, each of which attained its maximum in organization as well as in extent, and then sank into comparative obscurity. The flowering plants are traced backwards through the cycad-like forms of Mesozoic times to primitive fern-like seed-plants, from which the Gymnosperms are also derived through, at least in some cases, the Cordaiteae.

For the clear and plain way in which this complex history is given in a few pages one can hardly be too grateful. Dr. Scott shows that morphological characters are sometimes adaptive, and questions the theory of mutations, " the last resort of the phylogenetically destitute."

"The Influence of Environment on the Forms of Plants," by Professor Klebs (Heidelberg). For *Sempervivum* he finds that with strong light and vigorous carbon-assimilation a considerable increase in the supply of water and nutritive salts produces active vegetative growth, but a decrease in water and salts results in active flower-production. "Every experimental investigation shows that the fluctuation of characters depends on fluctuation in the external factors." "Abnormal developments of all kinds in stems, leaves, and flowers may be produced by parasitic insects, fungi, or by injury." These few extracts will serve to show the value of this important contribution for all practical horticulturists.

"Experimental study of the Influence of Environment in Animals," by Professor Loeb (California). The author gives his curious experiments in hybridizing sea-urchins with molluscs, &c. There is also much concerning the effect of light, gravitation, and temperature, especially on *Copepoda*, butterflies, and sea-urchins. He considers that every species has its own specific nuclear material or nuclein.

"The Value of Colour in the Struggle for Life," by Professor E. B. Poulton, describes in detail every kind and form of mimicry. Most of his instances are taken from butterflies or other insects.

"Geographical Distribution of Plants," by Sir William Thistleton Dyer. Darwin's original views are very thoroughly discussed and contrasted with those of Bentham, Hooker, and Wallace. There are also many interesting quotations from Guppy's recent work and some remarks on the influence of the Glacial period on the European Flora.

"Geographical Distribution of Animals." Dr. Hans Gadow shows that this is nothing less than the history of the evolution of life in space and time. He attempts to reconstruct the geography of the successive geological epochs and deals with such difficult questions as convergent species, adaptation, &c.

"Darwin and Geology," by Dr. T. W. Judd. This article is almost entirely an appreciation of Darwin considered as a geologist.

"Darwin's Work on the Movement of Plants." Dr. Francis Darwin, in this brief but interesting and important essay, describes the statolith theory of geotropy, sleep movements, circumnutation, and other physiological phenomena in the light thrown by recent researches.

"The Biology of Flowers," by Professor Goebel, is concerned chiefly with self- as contrasted with cross-fertilization, with cleistogamy and heterostyly. It is also for the most part a study and appreciation of Darwin's work.

"Mental Factors in Evolution." Dr. Lloyd Morgan's contribution is psychological. "The history of man's higher progress has been mainly the history of man's higher educability, the products of which he has projected on to his environment. This educability remains on the average what it was a dozen generations ago; but the thought-woven tapestry of his surroundings is refashioned and improved by each succeeding generation."

"The Influence of the Conception of Evolution on Modern Philosophy," by Professor Höffding (Copenhagen). It is sincerely to be hoped that every clergyman of every denomination will read, mark, and inwardly digest this valuable article, but we give up any attempt to review it.

"Darwinism and Sociology." Professor Bouglé (Paris) shows how writers holding the most different opinions all refer to Darwin for proof of their very various conclusions and have all been stimulated by the evolution theory.

"The Influence of Darwin upon Religious Thought," is by P. N. Waggett, M.A., S.S.J.E., who considers that it has been of value in three ways. These are : Encouragement of the Evolutionary Method in theology, Recoil of Christian Apologetics towards the ground of religious experience, and Restatement of the doctrines of Creation and Divine Design in Nature. Cambridge is still, we suppose, a seminary of religious education and it seems curious that no other Anglican Theologian has been asked to contribute to this volume.

"Darwinism and History." Professor J. T. Bury shows the insufficiency of general laws to account for historical development. He describes Lamprecht's theory regarding ages of changing "psychical diapason" (Spirit of the Times ?). There is also an elaborate analysis of the effect of Darwin on historical study.

"The Genesis of Double Stars," by Sir George Darwin, K.C.B. This is one of the most interesting contributions ; the story of the evolution of a planet is put so clearly that it becomes, as the author claims, a fascinating study which leads the reader to the very confines of our present knowledge.

"The Evolution of Matter." Mr. W. C. D. Whetham succeeds in explaining the new discoveries in radio-activity so clearly that the "educated layman" can not only understand these complex questions but is sure to realize their importance.

From these various extracts it will be seen that this book is an extraordinarily valuable one and ought, as it is intended, to appeal to the "educated layman." One should also mention that in the event of the volume being a financial success, the Syndics have agreed to hand over the profits to a University Fund for the endowment of biological research, which of course makes one hope that it will prove very successful indeed.

It would be prudent to venture nothing in the way of criticism, for obvious reasons.

Nevertheless it is surely the duty of a reviewer to be brave and to omit nothing which ought to be mentioned.

We wish that several of these articles did not so much remind us of the sermons of those ministers who, in bygone years, believed implicitly in the plenary inspiration of the Bible. Darwin would undoubtedly have vigorously objected to this manner of using his work. Nor can we pass over altogether "The Influence of Darwin on the Study of Religions" by Miss Jane Ellen Harrison. There is a valuable Science of Religions, but it requires in the student a serious and broad-minded spirit.

We find in this essay such remarks as "religious phenomena result from two delusive processes." We have failed to discover any proof that the author has realized the responsibility of writing on such a subject. Nor do we think that any just idea of the scientific study of religions can be derived from its perusal.

"Germ Life: Bacteria." By H. W. Conn. Sm. 8vo., 206 pp. (Hodder and Stoughton, London, 1909.) 1*s.* net.

Some years ago a little book entitled "Story of Germ Life" was published by Messrs. Newnes. The present is a reissue with a slightly different title, unaltered so far as the type goes, printed on paper of a different quality and with rather wider margins. The book is a useful one but here and there requires revision in order to bring it up to date so as to include more recent work.

"The Balance of Nature." By George Abbey. 8vo., xlvii + 278 pp. (Routledge, London, 1909.) 7*s.* 6*d.* net.

The principal wild mammals, birds and reptiles of England are briefly described in the first part of this book, classified under the headings "beneficial," "neutral," and "harmful." The second part is devoted to methods of scaring and trapping the harmful animals and birds, and this part seems to have provided the *raison d'être* of the book. A third part is given up to a brief consideration of some domesticated animals, useful as destroyers of vermin. The text is for the most part accurate so far as the facts dealt with are concerned, but the expressions made use of are often of peculiar (and sometimes ungrammatical) construction, rendering the book difficult to read. The illustrations, 150 in number, are described as diagrammatical. It seems very doubtful whether a diagram of a teal, or of a roebuck, or a sparrow-hawk perched in a most uncomfortable position, is very helpful to an understanding of the text, and, though some of them are not without humour, it cannot be said that the book would have been of much less value without them.

"Life and Matter." By Sir Oliver Lodge. 2nd Edition. 8vo., 106 pp. (Williams & Norgate, London, 1909.) 6*d.* net.

This well known little book now appears in paper covers. The chapters are the same, but, as the author says, "to some extent simplified." There is also a useful "Appendix consisting of definitions and explanations of technical and philosophical terms." But the most important change is in the preface. In the first edition the author wrote: "Incidentally it attempts to confute two errors which are rather prevalent:—

"1. The notion that because material energy is constant in quantity, therefore its transformations . . . are not susceptible of guidance or directoral control.

"2. The idea that the specific guiding power which we call 'life' is one of the forms of material energy," &c.

In the present edition Sir Oliver says: "It aims at upholding the theses:—

"1. That the conservation of energy is quite consistent with its guidance and control.

"2. That life is a guiding and directing principle, and not one of the forms of energy."

This way of stating the case—viz. of establishing a "Positive" instead of a "Negative"—is decidedly preferable. Sir Oliver thus upholds the conception of "Directivity" which is observable throughout the whole of the organic world.

"The Vegetation of some disused Quarries: The Conquest of New Ground by Plants." By S. Margerison. 8vo., 52 pp. (Gaskarth, Bradford, 1909.) 3*s*.

This is an admirable brochure, with thirty-three photographs of different aspects of the quarries, &c. It is an excellent ecological exposition, showing the stages of development, including successive extinctions of the first invaders, to the quasi-permanent establishment now existing. He also shows how the same species, *e.g.* ling, may assume different habits and also structures according to the spots in which it has found a more or less permanent home. We have often noticed various forms of ling on a fishmonger's stall when grouse is in season.

"Oecology of Plants. An Introduction to the Study of Plant Communities." By Eug. Warming, Ph.D., assisted by M. Vahl, Ph.D. Prepared for publication in English by P. Groom, D.Sc., and Dr. I. B. Balfour, F.R.S.. 8vo., 422 pp. (Clarendon Press, Oxford, 1909.) 8*s*. 6*d*. net; morocco, 10*s*. net.

No student of Ecological Botany can neglect this most important work. Since ecology means the application of physiology to plant life, with a complete study of external and internal morphology, with the sole object of discovering the adaptations of every histological detail, even the most minute, to the plant's own requirements, it is at once seen that it covers the whole plant world as it exists in nature.

This necessitates numerous divisions and subdivisions of the subject. Hence this great volume contains seventeen "sections" embracing thirteen classes [Classes IV. and VIII. seem to be misplaced; pp. ix. x.], and including 100 chapters in all.

The author begins with "Oecological Factors and their Action," requiring twenty-one chapters. "Communal Life" requires five chapters. Then follow clusters of chapters on Hydrophytes, Oxylophytes (on acid soils), Halophytes, Lithophytes, Psychrophytes (cold soils), Psammophytes, Eremophytes, Chersophytes (waste lands), Psilophytes, Savannah formations and Sclerophyllous formations (bush and forest), Coniferous formations and Mesophytes.

The last "section" deals with the Struggle between Plant Communities, the hundredth and last chapter being on the "Origin of Species." This chapter has only a little over five pages; brief paragraphs deal with the views of Darwin, H. de Vries, Vesque, and Lamarck. Darwin has ten lines, terminating with the sentence:—"This explanation [by Natural Selection] has recently been assailed on many sides, and does not now find so many supporters as it had when first promulgated by Darwin." Readers of Dr. Warming's works, such as *Lagoa Santa*, will be familiar with the fact that he entirely puts "Darwinism" on one side, seeing—as all plant ecologists do—that Darwin's own alternative (first given us in his "Animals and Plants under Domestication," vol. ii., p. 271), that new species arise by a *response* in the organism to the "direct action of changed conditions of life, without the aid of Natural Selection," is the true and only method which nature adopts for the making of new varieties and species.

"The Encyclopædia of Gardening." By T. W. Sanders, F.L.S. Thirteenth Edition. 8vo., 466 pp. (Collingridge, London.) 3*s.* 6*d.* net.

A book that has passed through twelve editions cannot require much recommendation. The author states that it has been thoroughly revised; and in an introduction starting from the garden of Eden, down through the ages, there is a very good *résumé* indeed of gardening and gardeners. Even Noah, we are told, "experienced delight in cultivating the vine"; truly he did, and drank too much of the wine he produced. The author rapidly surveys the history of gardeners down to the last century; and the work of such men as Thomas Andrew Knight, John Claudius Loudon, Sir Joseph Paxton, Charles Darwin, Dr. Lindley, Dr. Masters, and many others, is gratefully acknowledged.

The book itself is to be commended for its cheapness: it is on the lines of Nicholson's "Dictionary of Gardening," but that is beyond the means of many gardeners and amateurs; whereas anyone who cares to purchase books at all may afford the small sum required to purchase the work in question. In looking through the volume there is not much to object to—if one may except the cultural remarks, which are rather too definite. Thus under the heading of *Cattleya* is this advice, "Water three times weekly March to August; once weekly August to November, and February to March; once a month other times. Temperature, March to September 65° to 85°. September to March 60° to 70°. Resting period, winter." Now as to watering. A plant, whatever may be the genus, should only be watered when it is in the right state to need it; it is acting by square and rule to tell a cultivator to water once a month, once weekly, or three times weekly, at certain periods; if this were all, any novice could water Cattleyas; nor do they all rest at the same time in winter. They rest when growth is completed, and the best time to repot them is not in winter; but as soon as roots begin to push out from the base of the last formed pseudo-bulbs. This instruction as to watering is also given under *Phalaenopsis.* "Water daily March to April. Once or twice a week October to March." Probably April is a misprint for September, but it ought not to be in a thirteenth edition. The cultural remarks in other respects are such as may be depended upon, but in watering no one can advise the number of times any plants should be watered; climate, temperature, and the compost in which the plants are growing must be considered. To illustrate this: we sent on one occasion some Auriculas to an amateur, and, calling there subsequently, the gardener asked me why the Auriculas I sent required watering every day, while their own stock required it once in three days only. I could only account for this by more ample drainage or more porous soil in the set requiring most water. As a work of reference, for short instructions as to culture, and the natural order of genera, as well as the usual information required by gardeners and amateurs in their work, this book will be found a useful addition to the library.

"The Book of Nature Study." Edited by J. Bretland Farmer, D.Sc., F.R.S., assisted by a Staff of Specialists. Vols. I. to IV. 8vo., 212 + 222 + 228 + 210 pp. (Caxton Publishing Co., London, 1908-09.) 7*s.* 6*d.* net. each.

This book, which is being issued in six volumes, is composed of contributions from ten scientists, all of them experts on the subjects on which they write. The first two volumes, which are those now under review, deal with the animal world, and treat of the habits and structure of animals and the reasons for the difference between various animals in form and coloration, though each is made on a very similar plan to the others. The work is written primarily for the use of teachers, but it will be found to be very interesting by those who have a love for natural history, but have not had any definite instruction. In the preface the editor speaks of nature study in the following terms: "Amongst the studies that deserve to take a high rank in the educational subjects, that of nature study ought to occupy a high place, especially in the case of young people. It is concerned with all the phenomena of the world around us, and its problems are those which confront us everywhere in our daily life."

The first chapter opens with four questions which are asked by naturalists when studying an animal or a portion of one. The first, what is this? Second, how does it act? Thirdly, whence is this? Fourthly, how has this come to be as it is?

It is a great pity that the majority of collectors, when they have found an addition to their collection and have answered the first question to their satisfaction, are quite contented and do not take any trouble to answer the others, and except the names of their specimens cannot tell you anything about them. Such persons do not in any way deserve the title of naturalists. They only collect natural history objects in the same manner as persons collect stamps, &c. It is really much better to know something about an animal or plant, and not to know its name, than to know its name and nothing else about it. Of course it is important to know the name of a specimen, as otherwise it is difficult to make others understand what animal or plant you may be alluding to; and those persons who spend their time in naming things and in determining in what sequence they should be classed are doing very useful work, and are rather to be pitied as they spend their lives over such dry details. This work is a most interesting one, and suggestive of how the study of nature should be carried on even in channels which are not here indicated, and should have the effect of stimulating the reader to study natural objects instead of merely collecting them.

After this preliminary matter a chapter follows on "Mammals or beasts of the field," giving their chief characteristics and showing how they differ from others, and the peculiarities of certain types. Birds are then described much in the same manner. Some interesting figures are given showing the formation of feathers and the arrangement on the wings. The frontispiece is a dissected model picture of a pigeon, consisting of four coloured pictures placed one over the other, the uppermost one shows the bird as usually seen, the next represents it plucked, the third the skeleton, and the last the internal organs. This model shows the whole structure of a bird very clearly. There are also several figures of birds, their eggs, &c. The reptiles naturally follow the birds, and then the amphibians. Figures are given of the transformations of frogs in various stages. With the fishes the account of the vertebrates closes. Earth-worms and some insects are the subjects of the later chapters, the wasp being taken as the insect to be described in detail and figured. Other insects are mentioned in the second volume, bees, ants, gallflies, aphides, and gnats sharing the honours. Centipedes, millipedes, spiders and mites are not forgotten. Snails, slugs, and fresh-water mussels are the subjects dealt with in two chapters, the latter being illustrated by a "dissected model" given as a frontispiece to the volume. Plants and animals which may be reared in a fresh-water aquarium have each a chapter and many figures devoted to them. Various inhabitants of the sea are then described, and a chapter on the haunts of animals completes the second volume.

Vol. iii. contains chapters 1 to 4, written by Miss Laurie, on "The Life and Growth of the Shoot from the Bud"; "The Growth of Plants independently of Seeds"; The importance of Hairs in Plant Life"; and chapters 5 to 7, by Dr. Lang, on "Some Common Flowering Plants," *e.g.* "Spring Flowers and Early Summer Flowers."

Several of the statements made in connection with the work of the chloroplasts are somewhat loose, mainly through an endeavour to avoid circumlocution.

The chapters on the "Growth of Plants independently of Seeds" and on "The importance of Hairs in Plant Life" are excellent.

The second part by Dr. Lang should have come first, just as the examination of common plants should precede the study of the seedling and physiological processes and their effects upon plants.

The flowering plants described are among the commonest of the country-side. The writer lays great stress upon the study of their life-history and their ecology. Technical terms are used judiciously; the diagrams are very clear and distinct; the coloured illustrations, although few in number, are exceedingly good. Those who wish to obtain an introduction to botany might well make a start with this book.

Volume IV. is in three sections :—

Section I. deals with "Some Common Flowering Plants," by Dr. Lang, and is a continuation of Vol. III. Among the plants described are the cow parsnip, the potato, the foxglove, the heather, the rose bay willow herb, the dodder, and the mistletoe.

Section II. consists of chapters on ferns, mosses, fungi, lichens, moulds, yeast, and bacteria, by Dr. Cavers.

Section III. on ecology, by Miss Laurie, describes woodland vegetation, plant associations, and the vegetation of commons, heaths, and moors.

The illustrations, particularly those in Section III., are very fine indeed, and of great assistance to the text, whilst the diagrams in Section II. are a delight to follow, they are so beautifully clear.

We think Miss Laurie has excelled herself in the ecological section, whilst those sections written by Doctors Lang and Cavers made us wish we had had their valuable help when we commenced our botanical studies.

As an elementary book it stands far above anything we have ever read. The authors and the publishers are to be congratulated.

"Trees: a Handbook of Forest Botany for the Woodland and the Laboratory." By the late H. Marshall Ward, Sc.D., F.R.S. Edited by Professor Percy Groom, D.Sc. 8vo., 308 pp. (University Press, Cambridge, 1909.) 4*s*. 6*d*. net.

This extremely interesting book, which is profusely illustrated, is of particular value in that the strictly botanical portions are written in such a popular manner as to be readily understood. The work is crammed full of information about the forms and habits of our commonly cultivated trees and shrubs, with an appendix on seedlings, and is certainly the best book between the popular and scientific work that it has been my pleasure to peruse. Extremely interesting are the notes on tendrils, the functions of bark, and branching, while the short accounts of our trees and shrubs are remarkably accurate and to the point.

That the Austrian pine is not always readily distinguished from the Scotch pine, as stated in the work, is surely an error, for the shaggy habit of the one compares markedly with the refined appearance of the other. The bitter-sweet (*Solanum Dulcamara*) does not always die far back in the winter, and often far exceeds the height of 3–6 feet given in the description. But these are minor mistakes, and we strongly advise every lover of our trees and shrubs to procure a copy.

"The American Apple Orchard." by F. A. Waugh. 8vo., 215 pp. (Kegan Paul, London, 1908.) 5*s*.

Although this book was written for America we can strongly commend it to British readers, and especially to those about to embark on fruit culture on commercial lines. We have seldom seen a more instructive and practical work. Soil and situation make vast differences, and although the black loam on the eastern slopes of the Alleghany Mountains is famed for its excellent orchards, there are many black soils in Britain quite unsuited for apples; but all other soils mentioned by the author are found in abundance in this country, and will grow apples well. Mr. Waugh deals in a very clear manner with the advantages and otherwise of wind breaks for fruit plantations, and the advice on starting an orchard is excellent. Supplemented by a useful table of the quantity of trees required for an acre at various distances, orchard cultivation, and the methods to be employed, fill two large chapters, and contain much information well worth the study of all fruit growers. On the vexed question of pruning some capital instruction is given, and the objects of pruning are well stated. The chapter on the feeding of the trees ought to be carefully read. The same applies to the chapters on insect pests, diseases, spraying and solutions for spraying, though fortunately we have not to contend with all the pests of American orchards. Much of the information on gathering and packing the fruit is not applicable to this country, still a good deal may be learnt in the chapter devoted to this important matter, and we would particularly commend to fruit growers the following sterling advice:

"Select a few varieties only; choose standard market sorts; choose only hardy healthy varieties; plant no novelties or oddities." Such words of wisdom deserve to be brought before every fruit grower in large type. The selection of varieties given by Mr. Waugh is of course quite unsuited for this country.

"Chrysanthemums: a Manual for Exhibitors and all Growers of the Queen of Autumn Flowers." By R. Barnes. 8vo., 112 pp. (Maclaren, London, 1909.) 2*s.*

We think the writer of this manual has been very sensible in not giving long lists of varieties that may be quite out of date in a few years' time, but instead has paid more attention to the propagating, potting, manuring, taking of buds, insect and fungoid pests, and other matters of importance, not omitting the useful summer flowering varieties. The book is practical, and of a very convenient size.

"The Royal Gardens Kew: Historical and Descriptive." By W. J. Bean. 4to., 222 pp. (Cassell, London, 1908.) 20*s.* net.

A book on Kew, the finest botanic garden in the world, must be no easy task, yet Mr. Bean has treated his subject in a masterly manner and in his usual thorough style. In the opening part the early history of Kew, its ebbs and flows, successes and trials, are well displayed, but under the directorship of Sir William Hooker, Sir William Thiselton-Dyer, and the present director, Colonel Prain, Kew has become a great national garden of which all Britons are proud. In the second part the landscape, the formal and architectural features, the avenues, lawns, vistas, wild garden, water garden, rose, bamboo, rhododendron, azalea, and other gardens are admirably described. In part three the scientific side of Kew is equally carefully dealt with and the famous North Gallery and the interesting museums. Part four is devoted to the glass erections at Kew and their many and diversified occupants, while the fifth and last part is taken up with the gardens of hardy plants, such as the arboretum, pinetum, alpine and herbaceous plants, &c. In addition to an introduction by Sir William Thiselton-Dyer, the book contains twenty reproductions in colour from paintings by H. A. Oliver, and forty half-tone plates from photographs by E. J. Wallis. These, combined with excellent printing on good paper, make up a very interesting, instructive, and handsome book.

"The Romance of Modern Geology." By Edwin S. Grew, M.A. 8vo., 308 pp. (Seeley, London, 1909.) 5*s.*

This is one of the volumes of the "Library of Romance." The illustrations, which are beautifully clear and distinct, are a great feature of the book.

The paper is not glazed and the printing large and clear, so that it is easy to read. It is a book that we wish we had read when we got our first introduction to the study of geology, for there is not a dull page from cover to cover.

It begins by drawing attention to the breaking down and building up of the shore that is taking place close to home. The great denuding power of rivers is well shown. The state of strain existing in the earth is admirably illustrated by comparison with the modern rubber-cored golf ball.

An entirely novel view of the shape of the earth without its oceans is described by the author as that of a pear-shaped body. This idea is very cleverly worked out. In fact this contrasting with known common occurrences and things to explain the unknown and in some cases difficult theory is quite a feature of the book. This is done, too, without straining. "The Effects of Weather upon the Earth's History," "Records left by Rivers" as shown in the cañons of the Colorado, "Earthquakes," "Volcanoes," "The Age of Reptiles," "Mammals" and other extinct monsters, "The Ice Age"—these are some of the many subjects dealt with.

"Plants and their Ways: an Introduction to the Study of Botany and Agricultural Science." By Ernest Evans. 8vo, 171 pp. (Dent, London, 1908.) 1*s*. 4*d*.

This book, whilst containing some good features, is not in line with modern methods. To introduce such terms as oosphere, embryo-sac, nucellus, integuments, at such an early stage of the book as page 6 is unfortunate. We think the structure of a flower studied at an early stage should be limited to what is able to be seen with the naked eye, as far as possible, then appeal to the lens, and finally to the microscope, when the student is well advanced in botanical study. Technical terms, too, should be reduced to a minimum, particularly as the book is "an introduction to the study of botany." Again, to introduce the fern plant and parasites into such a class of books is wholly unnecessary.

On page 87 in too briefly noting "the work done by lime in the soil" the following statement appears:—"The lime neutralizes any acid which the soil may contain and sweetens it." This without any previous mention of what "neutralizing an acid" means is a grave breach of modern methods of approach. On page 15, under the head of "Practical Work to ascertain what is Pollen," the diagram illustrating the pollen grain; and further on those of a "Section through an Ovule," as well as "the diagram showing the ovule after fertilization," require the use of a microscope, and hence are unnecessary in an introductory work. We should have liked to have seen the chapters on "Cultivated Plants and Common Trees" and "Plant Societies" more fully treated. The book seems to us to have been hastily produced in response to the great demand for books on nature study, with which, to our mind, it has very little in common.

"Nature Rambles in London." By Kate M. Hall, F.L.S. (Hodder & Stoughton, London, 1908.) 3*s*. 6*d*. net.

The author introduces to us in a most interesting fashion Nature in her seasonal dresses in London parks. Nature as she appears in plant and animal life is charmingly described, and at the same time a large amount of information is conveyed.

The illustrations, which number nearly 100, are a great feature of the book and admirably assist the text.

The idea of giving a list of the trees and shrubs to be found in the various parks is a good one and worthy of extension.

"Elementary Agricultural Chemistry." By Herbert Ingle, B.Sc. 8vo., 250 pp. (Griffin, London, 1908.) 4*s.* 6*d.* net.

The writer treats very briefly, perhaps too briefly, of the Atomic Theory, Properties of Oxygen, Hydrogen, Carbon, Nitrogen, Sulphur, Phosphorus, Calcium, Potassium, Sodium, Magnesium, Iron, Chlorine, and Silicon as an introduction.

The Chapters on "The Plant," "Manures," "Crops," "The Animal Body," "The Feeding of Animals," and "The Dairy" are particularly well done.

"Life Histories of Common Plants." By F. Cavers, D.Sc. Lond. 8vo., 363 pp. (Clive, London, 1908.) 3*s.*

In this book the student is skilfully directed to find out things for himself by the examination of fresh specimens, the foremost place being rightly given to physiology and ecology.

The earnest student who does not mind painstaking work will appreciate this book, particularly as the necessary materials and apparatus can be obtained at a trifling cost. If he works through it he will have laid a solid foundation for a sound acquaintance with the structure and life processes of plants, and the relation of plants to their surroundings.

After taking the broad bean as a type under the heads of "Seeds and Seedlings," "The Green Plant's Nutrition," "The Growth of Root and Shoot," "Buds," "Flowers, Fruits, and Seeds," the life histories of such plants as the sweet pea, vetches, clovers, and common representatives of the *Ranunculaceae*, *Rosaceae*, *Violaceae*, &c., are very well worked out.

"The Life of Philibert Commerson, D.M., Naturaliste du Roi. An old-world story of French travel and science in the days of Linnæus." By the late Captain S. Pasfield Oliver, R.A. Edited by G. F. Scott-Elliot, F.L.S., F.R.G.S. 8vo., 242 pp. (Murray, London, 1909.) 10*s.* 6*d.* net.

Mr. Elliot first gives us a short account with portrait of Captain Oliver and his travels, followed by the editor's preface, in which Oliver knowing that his death was near entrusted all the materials to Mr. Elliot, who although he says he takes "no credit" for his share has produced a most interesting and fascinating work.

The book contains thirteen chapters, which begin by carrying us from his student days in the Montpellier Gardens and in various parts of France, till he marries and moves to Paris.

Then follows some account of Louis Antoine de Bougainville—whose name is perpetuated in the well-known plant—with whom Commerson subsequently travelled. He it was who carried the terms of surrender to the British camp when Canada was definitely lost by the French (Sept. 8, 1760), a man of most remarkable abilities. The sixth chapter describes his journey to Buenos Ayres, his enthusiasm not only for botany but also fishes, about which many interesting details are given. He reaches the Spice

Islands, and we hear a good deal of the Tahitians. They just see Australia, but pass too far off in going to Mauritius, about the botany of which much is said.

Then followed Madagascar, a perfect mine of wealth for his botanical enthusiasm. Here he found a race of pygmies on the mountains and compares them to the dwarf alpine plants. In the island of Bourbon, which he thoroughly investigated botanically, he found more new and curious fishes; some good photographs are supplied of insects mimicking sticks, leaves, &c.

He died on March 13, 1773, never having lost his enthusiasm for science, and "eight days after his death in Paris he was elected a member of the Academy of France by a unanimous vote in a full assembly. This was an honour unprecedented in the history of that body. No other *savant*, however eminent, had ever been elected in absence."

The final chapter deals with Commerson and his scientific work.

Would that every student would read the book and try to share in his enthusiasm.

"Essays, Biographical and Chemical." By Sir William Ramsay. 8vo., 247 pp. (Constable, London, 1908.) 7*s*. 6*d*. net.

The history of chemistry, as generally treated, quite fails to interest one who has little special knowledge in that subject. The author of this work, however, has succeeded in presenting certain periods to the general reader in a most delightful manner. The whole volume is written in non-technical language as far as possible, and where technical terms are introduced they are carefully explained in such a way that the reader with only a general scientific knowledge should appreciate the extremely interesting series of subjects dealt with.

The volume is divided into two sections dealing respectively with historical and chemical essays, and throughout the author has given expression to his high appreciation of the characters of those of whom he treats, and of the value of their labours in promoting the growth of scientific ideas. Due importance is given to the life of the man, as well as to the work of the chemist. One would perhaps hardly expect to find Lord Kelvin regarded primarily as a chemist, and this may explain the rather inadequate treatment of his work.

With regard to the chemical essays, subjects of recent inquiry are dealt with, and while the essay on "What is Electricity?" can hardly be described as convincing, that on the "Aurora Borealis" provides a good example of the wide range of knowledge required to enable one to attempt to explain one of the most interesting of natural phenomena, more especially to the reader of no great scientific attainments. In attempting to explain too much, the line of one's argument is liable to be rendered indistinct, but by careful summarizing the author has to a great extent avoided this difficulty.

The last essay deals with the "Functions of a University," and will appeal to all who are in any way interested in educational matters. It emphasizes the fact that the modern university is an essential factor in the progress of industry, rather than a convenient centre for the acquisition of mere knowledge or social conventionalities, and anyone who doubts the advisability of Government support is recommended to study the author's arguments.

"Electricity, Present and Future." By Lucien Poincaré. Translated by Jasper Kemmis. 8vo., 315 pp. (Sisley, London, 1908.) 7*s*. 6*d*. net.

This work is a review of the various steps that have led up to the present knowledge and applications of electricity. The language employed is not too technical, but a good deal of technical knowledge will be required to enable one to appreciate the author's very able and comprehensive treatment of his subject. Due prominence is given to the dependence of industry upon science, while it is shown that science has in many instances been a debtor to industry in having problems needing solution provided for her.

Only a few pages are devoted to the "Future Evolution of Electricity," and in these are indicated a few of the immense number of paths along which future developments are to be expected.

"The Perfect Garden: How to keep it Beautiful." By W. P. Wright. 4to., 408 pp. (Grant Richards, London, 1908.) 6*s*. net.

This is a handsome well-printed volume, opening with a prologue on dream gardens, followed by the subjects divided into five parts. Part I. treats on the design of gardens, the cost of gardening, specialism in gardening, how to learn gardening, and the conquest of the wild. We endorse every word the author says in this part, and taking into consideration that the book is written chiefly for those who possess or intend making a comparatively small garden, we can advise all such to study this part carefully, especially the chapter on the cost of gardening. Part II. fills a large portion of the book, and deals with practically every phase of the flower garden, including colour, herbaceous plants, rockeries, roses, lilies, trees, shrubs, bulbs, garden enemies, &c. The list of plants, with their different heights and the colour of the flowers, is compiled in an excellent style, and will be most useful to the amateur gardener who may intend making an herbaceous border. The same applies to the rock plants, although only a short list of the plants available for the rock garden is given; still quite sufficient are named for any ordinary-sized rockery, and a bigger list might be confusing. Only a small portion (pp. 237–250) is devoted to the glass-houses, but this part is filled with very serviceable information. Part IV. deals with hardy fruit, and after giving instructions on how to make a fruit garden the author tells us what to plant, and here we consider too many varieties are named. In apples we should leave out Blenheim Orange because even in the Paradise stock it is a shy bearer, New Hawthornden is a bad cooker, Worcester Pearmain is a vastly overrated variety, and Cornish Gilliflower is delicious when you can get a crop, but it is one of the shiest bearers. In pears again we should omit Beurré Clairgeau, Clapp's Favourite, Conference, Beacon, and General Todleben. Part V. is given up to vegetables, which are ably dealt with, and then follows a series of very good plans of gardens.

"Golf Greens and Green Keeping." Edited by Horace G. Hutchinson. 8vo., pp. 219. (*Country Life*, London, 1906.) 10*s.* 6*d.* net.

This book is made up by contributions from specialists on golf greens and green keeping, and deals with soils in various parts of the kingdom where golf is played, and owing to the varied characters of the soils the book should prove a very useful one for golf players and others interested in this popular pastime. All the chapters are admirably written, and the information is so plain that anyone may easily follow the writers' instructions, and we would suggest that committees presiding over golf courses should give their green-keeper a copy of this book. In the next edition we would suggest a few notes being added on the best grasses to use for greens on different soils, so that the green-keeper could not only sow the grasses best adapted to his own soil, but also be able to sow seeds for producing turf to replace worn-out places. The mat grass (*Nardus stricta*) and *Agrostis vulgaris* are specially advised for seaside links and for damp ground, but little else is said about any other good grasses to use.

"Sea-coast Gardens and Gardening." By Frances A. Bardswell. 8vo., 145 pp. (Sherratt & Hughes, Manchester, 1908.) 3*s.* 6*d.* net.

A well-got-up and interesting work, based on practical experience gained by the authoress in an exposed windy position on the Norfolk coast. Some of the matter we have seen in the *Garden* and *Country Life*, and some information is quoted from that excellent book "Seaside Planting," by Mr. Gaut; but we can recommend all really interested in seaside gardening or planting to read the authoress's experience, combined so delightfully with information she has collected from other sources. The book is nicely illustrated.

"Gardening Made Easy." Edited by E. T. Cook. 4th ed. 8vo., 202 pp. (*Country Life*, London, 1908.) 1*s.* net.

As the editor states, this is a simple handbook to the garden written for beginners, and we must say that he has achieved his object admirably. It would be invidious to single out any special chapters or chapter; it will suffice to state that ornamental plants, vegetables, and fruits most suitable for beginners to choose are named, followed by descriptions of climbing plants, lawns and how to make them, the rose garden, the greenhouse, bulbous plants, the kitchen garden, the fruit garden, herbaceous plants, &c.; in fact, nearly everything that the amateur or beginner in gardening requires is clearly and concisely dealt with by the author. It is a very cheap practical book, within the reach of all.

"Illustrations of the Royal Gardens, Kew." By E. J. Wallis and Herman Spooner. Obl. 4to., pp. 64. 1908. 1*s.* net.

Mr. E. J. Wallis has produced some beautifully executed photographs or illustrations of these famous gardens, and Mr. Herman Spooner has written most interesting notes bearing on the illustrations. Many who have visited and enjoyed Kew will be delighted to get such a charming memorial of their visit. The late Director has written a brief history of

Kew and other items of interest, and we compliment Mr. Spooner on the manner in which he has written his descriptive notes, for he not only explains the illustrations very clearly, but gives the history and habitat of many of the plants shown; for instance, in describing *Amorphophallus Titanum*, he says: "It was discovered by Dr. Beccari, the illustrious traveller and botanist, in the province of Padang, in Sumatra, in 1878. Beccari at first found the leaf only, and offered a reward to the natives for a flower, and to his surprise it required two men to carry the ponderous mass. To give an idea of the dimensions of the flower in its native home it is sufficient to say that a man standing upright can barely reach the top of the spadix, and with open arms can scarcely reach half-way round the circumference of the spathe."

"Sweet Peas and How to Grow Them." By H. H. Thomas. 8vo., 112 pp. (Cassell, London, 1909.) 1*s.*; cloth, 1*s.* 6*d.* net.

A very useful little book of convenient size for the sweet-pea growers, and their name is legion, giving full directions as to how to grow them, the best varieties to grow, hybridizing, diseases, pests, in fact all one could reasonably wish to know is supplied in this well-written book.

"An Artist's Garden, Tended, Painted, Described." By Anna Lea Merritt. Demy 8vo., 195 pp. (George Allen, London, 1908.) 21*s.* net.

This is a beautiful book, handsomely illustrated and admirably printed on excellent paper; but its charm is, in our opinion, quite spoiled by the authoress's attack on a very industrious, respectable, capable, and painstaking body of men. We cannot imagine a nastier term to apply to a gardener than to call him "a hireling gardener," classing him amongst such perversities as "insects, moles, mice, and blights of mildew and manners." It is scarcely obvious why "gardeners ought to have wide faces and eyes far apart." No reason is given why they should be different from the rest of the human race, and it seems that the writer of this book must have a very poor opinion of all gardeners, as she tilts at the want of taste displayed by the professional gardener. Even artists have very opposite ideas of taste, and to dogmatically state that most professional gardeners are lacking in taste would not be endorsed by all other artists.

"In My Lady's Garden." By Mrs. Richmond. 8vo., 464 pp. (Unwin, London, 1908.) 12*s.* 6*d.* net.

The authoress tells us from her own experience what to do, and what to expect in flower every week for the whole year, the whole being written so clearly that no one can make any mistake as to the meaning or instruction given. In every garden of any extent "my lady's garden" is of more than ordinary interest, and we naturally expect to see good taste, neatness, and order prevailing; and to these ends Mrs. Richmond's book ministers in a marked degree. The information on the most beautiful flowers to grow is excellent, and the positions they succeed best in are well described. Aquatic, wild garden, herbaceous, sub-tropical, stove, greenhouse, hardwooded, and other plants are all brought under the notice of the reader in a charming manner, and the advice on laying out and planting a garden, though brief, is very much to the point. The volume is well printed and illustrated.

"Gardening in the North." By S. Arnott and R. P. Brotherston. 8vo., 272 pp. (Cassell, London, 1909.) 2*s.* net; cloth, 2*s.* 6*d.* net.

Although this book is written for gardeners in the north. much of the information is equally suitable for those in the south. Stress is laid on the climatic conditions of the north, but there they never get the hot drying periods in summer experienced in the south; at the same time this book should prove an acquisition to the young gardener in any part of the kingdom, as it is crammed with really sound practical information on almost every phase of horticulture. The information on plants that will thrive in the immediate neighbourhood of smoky towns, will be valuable for those who do their gardening under such unfavourable conditions, and the lists of plants, fruits, and vegetables, and the calendar of operations are excellent.

"Grape Culture up-to-date." By Alexander Kirk. 8vo., 75 pp. (Pawson & Brailsford, Sheffield, 1909.) 7*s.* 6*d.* net.

In this latest publication on grape culture we have the experience of one of the most successful growers and exhibitors in the country, and many will welcome his book. He describes in a minute manner how his success has been attained, and we especially advise young gardeners to read, mark, learn, and inwardly digest all the sound practical instruction and information given by Mr. Kirk. We believe that grape culture in private gardens does not reach such a high standard as it used to do. There are of course exceptions, but a gardener who can place large bunches with large berries well coloured and of fine flavour on his employer's table will find himself appreciated, and should he need a situation he will gain points in the final selection of a gardener. Practically everything the grape grower under glass may wish to learn is given in this book, the capital illustrations being a great aid to the inquirer. The construction of vineries, drainage, compost, planting, pruning, thinning of the berries, forcing, watering, feeding, ventilation, renovating, storing, diseases, pests, &c., are only a few of the items admirably dealt with.

"The National Rose Society's Handbook on Pruning Roses, 1909." New and Revised Edition. Compiled by a Committee of the Society. (Mr. E. Mawley, Rosebank, Berkhamsted, 1909.) 2*s.* 6*d.*

This little book supplies a long-felt want, as all rose growers frequently feel in doubt how various kinds ought to be pruned, and in this book they get the instruction required. The information on early autumn thinning of growths we particularly commend to all growers, as it improves the productive power, and also the appearance of the plants, amazingly. The errors made in pruning are pointed out very clearly. The book closes with an excellent alphabetical list of varieties.

"Thirty-nine Articles on Gardening." By Emmeline Crocker, F.L.S. 8vo., 159 pp. (Dulau, London, 1908.) 5*s.* net.

This will prove an interesting book to amateurs and professional gardeners, as the style is pleasing, and the information on plants growing in their natural habitat is just what is wanted by the cultivator in this country. The thirty-nine articles or chapters are too numerous to give in detail, but they cover the following and other subjects, viz. iris, alpine plants, seeds, weeds, annuals, Primulas, insectivorous plants, roses, shrubs, bulbs, sub-tropical plants, pruning, propagating, &c. We think there are too many words printed in italics; if confined to the names of plants the work would have been improved, but as it is italics are freely used for all sorts of words which the authoress desires to emphasize. However, this may be a matter of taste; many will no doubt approve of what we disapprove.

"Intracellular Enzymes." By H. M. Vernon, M.A., M.D. 8vo., 240 pp. (Murray, London, 1908.) 7*s.* 6*d.* net.

This work will appeal chiefly to those interested in the chemical side of the physiology of animals and plants. The subject matter, however, is of very great importance to all advanced students of biology and much of the information has been collected in one volume for the first time. The book is based on lectures given at the Physiological Laboratory of the University of London. The author truly summarizes the importance of the subject by stating that it "bids fair to become, if it has not already become, one of the most important branches of biochemistry, for it alone seems to offer a clue to the solution of the most fundamental of all biological problems—the nature and constitution of protoplasm."

Observations of enzyme activity have accumulated so rapidly during the last few years that we are unable at present to clearly estimate the importance of the results obtained. We "cannot see the wood for the trees." This is no doubt the reason why Dr. Vernon has found it difficult to fit together fragments collected with much industry from the scientific journals of the world. Many of the results obtained by the original workers are mutually contradictory, and many more are difficult to explain. The author has endeavoured to deal critically with this mass of material, and has accomplished his task fairly and judiciously. His own original observations, which are many and important, receive the same impartial treatment. It would, perhaps, have been convenient to busy workers if the vegetable enzymes had been separated from the enzymes of the animal world, but comparison between similar enzymes in the two kingdoms would then have been made more difficult. At present, to quote but one instance, the proteolytic enzymes of animals are much better understood than those of plants, and any worker who wishes to deal with the proteases of plants must first become acquainted with the work of animal physiologists. Dr. Vernon has laid due stress on theoretical questions such as "the rate of enzyme action," "reversible enzyme reactions," "the energy relations of reacting systems," "the influence on reaction of temperature and of the products of reaction," and he has emphasized the fact that enzymes may, and often do, synthesize as well as decompose. They are factors in anabolism as well as in katabolism.

The student will find the book a mine of information, but he must be prepared to dig. It is not a volume of light literature for leisure hours. Full references are given to all the most important original papers.

"The Heredity of Acquired Characters in Plants." By Rev. Professor G. Henslow, M.A., V.M.H. 8vo., 107 pp. (Murray, London, 1908.) 6*s*. net.

This little book contains the grounds upon which the learned author bases the belief he so strongly holds, that acquired characters in plants are hereditary, and that all hereditary characters have at some time or other been "acquired." He defines "acquired characters" as "any change of structure (morphological or anatomical) from the normal characters of any part or parts of a plant (*i.e.* in comparison with others of the same species or genus which have not changed at all) through the means of a response to some new and direct action of the external influences of the environment or 'changed conditions of life.'"

No one who gives any thought to the question can fail to be struck with the adaptive structures exhibited by plants and by the fact that the progeny of one plant may vary greatly according to the conditions under which it is found. The assumption that plants can vary so as to acquire any adaptive character and that such acquired characters are hereditary affords an easy and obvious explanation of many of the phenomena we may observe on a country walk. Indeed, the explanation appears a little too obvious, and in reality the question is beset with difficulties, as are most questions connected with the phenomena exhibited by living things.

Variations appear to be of two species. There may be variations in kind, so that a plant possesses a character or it does not; for instance, a pea may possess the character that makes for tallness, or that character may be absent, and the pea will then be dwarf, and with the dwarfness other characters entirely dependent upon it will be exhibited. On the other hand, variations may be in degree. A tall pea may be more or less tall, a dwarf more or less dwarf; but recent experiments seem to show there to be a mark of delimitation between the two. In this book, although here and there some hint of the existence of two species of variation is given, yet nowhere is it plainly stated that these two species exist.

Very frequently one finds that plants grow where they can, not where they can grow best. There are many instances known of plants which hold their own in a certain place, but which when removed to another situation grow with such vigour as to become the dominant feature of the vegetation. We may interpret this in two or three ways, but it would appear quite probable that the plant was better adapted to an environment different from its original one. That is to say, its adaptation to its environment was imperfect. It is not obvious why, if it were able to adapt itself so far, it could not adapt itself perfectly. As Darwin pointed out, there are many adaptations to environment which fall short of perfection. Why should self-adaptations to environment be imperfect?

Again, there frequently appears to be no direct correlation between the habitats (environment) of two distinct varieties of a species and their characters. Not far from where we are writing one may find the common form of the ling (*Calluna vulgaris*) growing with its branches intertwined with the hoary variety *incana*. Are these both equally adapted to their environment, and if so, why did they not vary in the same direction? In ages past one cannot doubt that environment had precisely the same material to act upon—these had a common ancestor. Or is Nature, perhaps, experimenting?

The origin of variations in kind seems still to seek; or perhaps it is only the origin of the material basis of the power to vary, and from a definite knowledge of what that is we seem to be still far off.

All the book contains is worthy of careful reading and consideration; but whatever the origin of variations may have been we are through the careful experiments of many workers being shown that for practical plant breeding the only sure method is to start with the variations shown by individual plants and to breed from individuals, not from promiscuously crossed groups of the same species.

Here and there the book appears to bear the impress of having been compiled in a hurry, which could be no gain. For instance, the references on p. 94 to the plate are all wrong, and it is stated that "*Tamus communis* appears to have one cotyledon" when "two cotyledons" was intended. Other somewhat similar mistakes are noticed on p. 8, p. 52, and p. 53.

"The Principles of Microscopy." By Sir A. E. Wright, M.D., F.R.S. 8vo., 250 pp. (Constable, London, 1906.) 21*s.* net.

This is a highly technical manual intended for those who are willing to make microscopy a matter of intellectual study. Everyone who uses the microscope seriously should no doubt do this, but, unfortunately, the time at the disposal of most does not permit of studying the instrument so elaborately as the author would have one do, and instead the student has to be content with rule-of-thumb methods and the experience gradually gained by trial and error during the progress of his work. But for those who wish to obtain a thorough knowledge of the fundamental principles underlying the development of proper images in working with the microscope there is no better guide than the volume before us.

"Pronunciation of Plant Names." By Rev. C. Butler, M.A. Small 8vo., 94 pp. (*Gardeners' Chronicle*, London, 1909.) 1*s.* net.

The pronunciation of plant names often presents difficulties and particularly in regard to which syllable should be emphasized. With this guide to hand no one need be at loss. It is of convenient size and contains all the generic names that are likely to be met in even the largest garden. While, unlike the admirable list in Nicholson's "Dictionary of Gardening," classical usage is departed from in some names, as Anem'one, the author has probably followed the better course in adopting the more popular pronunciation. The vexed question also as to how far local pronunciation should be followed in generic names derived from personal names is got over by retaining the local pronunciation, (though not always completely). Thus *Halesia* is Hāl'-zi-a, *Stokesia*, Stōk'-si-a, *Heuchera*, Hoi'-kĕra, and so on. The author does not attempt *Tchihatchewia*!

The list is very free from errors in the generic names themselves, though "*Absinth*" (p. 1) should have been *Absinthium*, and "*Eschscholtzia*" (p. 33) was originally spelt without a "t," as it is in "Index

Kewensis." The book is a welcome addition to the indispensable companions of the gardener, amateur or professional.

"Botany for Matriculation" By F. Cavers, D.Sc., F.L.S. 8vo., 568 pp. (University Tutorial Press, London, 1909.) 5*s.* 6*d.*

This is an excellent book of its kind, full, clear, and concise, and contains an admirable exposition of ecology. The majority of elementary text-books of preceding years dealt solely with structure with the view to classification, but since ecology has become a subject of examination, students are compelled to study plants from a new point of view. The author says in his preface: "The fact that I regard ecology and physiology as the aspects of plant life which should be chiefly presented to beginners will explain—and, I hope, justify—the inclusion in this book of a good deal of information which is given in works of chemistry, physics, meteorology, and geology." Looking at it from a *beginner's* point of view, we think Chapter II. should have been postponed to p. 516, and precede, or even follow, the chapter on ecology; but the fact is no book on botany can be read straight through. The student studies various parts of plants *as he can get them.* He can study seeds in the winter, then germination in spring, &c.; but ecology he can pursue at all seasons, whenever he can take a walk into the country. He thus gathers his knowledge as it is possible, and may study any part of the book before us as he requires it. The author rightly describes types, not in any strictly classificatory sequence, but just as a student must study them in nature. There appears to be a few omissions, such as the anatomy of the *insertion* of stipules, an infallible clue to their origin and nature. No mention is made of the special rays concerned in transpiration, viz. violet and red; yellow and blue are rightly stated as necessary for photosynthesis. In answering the question, "Is light required for starch formation?" the use of sugar in the reformation of starch in tubers, *without light*, might be alluded to. The author seems to still hold Darwin's *original*, but not later, view of the injurious effects of self-pollination (p. 267); but on p. 288 he describes the special arrangements for it. The fact is Darwin made a mistake!

We can heartily recommend this book to all who will use it as a help and a guide to their study and examination of living plants.

"Agricultural Botany." By Prof. J. Percival, M.A., F.L.S. 3rd Ed. 8vo., 806 pp. (Duckworth, London, 1907.) 7*s.* 6*d.* net.

This is perhaps the best book upon agricultural botany, and the fact that it has reached its third edition shows that its value has been appreciated by students. This edition has been further improved by a short but lucid account of the Mendelian law of inheritance.

"The Bird-life of London." By Charles Dixon. 8vo. 335 pp. (Heinemann, London, 1909.) 6*s.* net.

This book describes 135 species of birds as from time to time coming within the neighbourhood of London, though a few of these, as the raven and the peregrine falcon, are only of historic interest. The book is pleasantly written and shows a very thorough personal knowledge of the birds and their haunts. The introduction contains a list showing the birds that are resident, those that are summer migrants, those that are winter visitors, those seen on migration, and those only occasionally or accidentally visiting the district.

Each chapter starts with the local names by which each bird is known, its distribution in Britain, and its distribution within fifteen miles of St. Paul's.

The foods, habits, and notes of the birds are described, as well as the appearance of the adults and nestlings. The illustrations of the bird, some in colour, others in black and white, are by Mr. John Duncan, of Newcastle, and though most of them are small they are very well drawn and life-like. More might have been said of making artificial nesting boxes in the London parks to encourage certain birds nesting there. The book is one of the most interesting on birds we have had the pleasure of reading.

"Birds Useful and Birds Harmful." By Otto Herman (Director of the Royal Hungarian Ornithological Bureau, Budapest) and J. A. Owen, illustrated by T. Csörgey. 8vo., 387 pp. (University Press, Manchester, 1909.) 6*s.* net.

This book is divided into the following chapters: 1. Useful or Harmful. 2. Structure of the Bird. 3. Workers on the Ground. 4. In the Air and on the Trees. 5. The Farmer's Summer Friends. 6. Workers all the Year round. 7. Some Wildfowl. 8. Some of the Falconidae. 9. The Rational Protection of Birds.

The origin and work of the Hungarian Central Office for Ornithology is briefly described. It starts with the idea that nature itself knows neither useful nor injurious birds, but only necessary ones, which have developed according to the natural laws, and on the basis of their development are performing in the world of nature the work which is appropriate to their organization. Where nature is intact, the number of birds is automatically regulated in accordance with the natural development of their surroundings.

The adaptability of wing, bill, foot, and feathering to the various purposes in the life of the bird is well illustrated.

These two naturalists deal duly with the harm as well as the good done by birds. To English naturalists and cultivators the book would have been of additional interest if a summary had been given of the results obtained by the Hungarians in examining the stomachs of the various birds to ascertain their food and habits, and it would be of interest to know the source of some of the information, whether from Hungary or England. A few of the birds described are practically unknown in England, though perhaps common in Hungary. Passing by the useful birds, we quote a few opinions on some of the birds that do a certain amount of harm; thus with reference to starlings among cherries it says: "Even the most ardent bird-lover will not be foolish enough to protect every bird at all times and seasons," and recommends scaring by the gun, &c.; if a long narrow flag be fixed to a strong branch on tall cherry trees these birds will be kept away. The starling has been introduced into South Victoria, Australia, and though useful on pasture it clears the vineyards of fruit.

The blackbird was introduced into New Zealand, but now a price is put on its head and eggs on account of the damage it does to fruit.

Fruit needs also to be protected from the thrush. Of the sparrow it is said: "It is true that the common sparrow multiplies too fast. Many a bird-loving landowner and farmer attempts to keep it within bounds in various ways. The late Lord Lilford declared the most humane way was to pull down all the nests within man's reach; there would be plenty left in inaccessible places. A humane farmer in Hampshire, a great wheat grower, pays 3*d.* per score for all sparrows' eggs brought to him. In a Lancashire parish the vicar encourages the jackdaw, allowing it to build even in his church-steeple, because wherever that bird is, sparrows become more scarce, their young suiting that bird's palate well."

In the case of the rook early sowing of wheat is recommended, while there is sufficient insect food about for the birds, as the best preventive from the mischief it does in disturbing and eating the corn. A good description of the ways of the hawfinch with regard to peas is given quoted from the observation of a gardener. The injury to gooseberry buds by bullfinches, to swede and turnip seed by greenfinches, and to turnip-tops and acorns by wood-pigeons is dealt with.

The book concludes with particulars and drawings of nesting boxes for the encouragement of certain birds.

We can recommend the book as combining the natural history of birds with their economic habits in relation to the gardener and the farmer, but wish the opportunity had been utilized of giving the results of the observations on the food of birds actually made by the Hungarian Bureau of Ornithology.

"British Birds in their Haunts." By the late Rev. C. A. Johns. Edited, revised, and annotated by J. A. Owen; illustrated with 64 coloured plates, 256 figures, by William Foster, M.B.O.U. (Routledge, London, 1909.) 7*s.* 6*d.* net.

This attractive book gives interesting accounts and observations of the birds by the late Rev. C. A. Johns, F.L.S., with scientific classification brought up to date, together with additional facts of interest by Mr. J. A. Owen. The coloured illustrations, of which there are 256, are good representations of the birds in miniature.

"Birds and their Nests and Eggs found in and near Great Towns." By George H. Vos, B.A., M.B. (Cantab.). Three volumes or series. 8vo. 148 + 223 + 240 pp. (Routledge, London, 1908 09.) 1*s.* each. Also the three series in one volume 3*s.* 6*d.*

These little books are well illustrated by numerous photographs by the author, of birds' nests, eggs and surroundings from life, or of good specimens of stuffed birds in natural surroundings. The author gives accounts of his natural history rambles and observations at different times of the year. At the end of each volume is a very concise synopsis of the birds mentioned, which must be the result of careful observation, dealing with points such as favourite localities, differences in plumage, colour, size, mode of flight, manners, postures and notes, migratory habits, materials of nest, shape and size of nests, coloration of eggs, and the number of eggs in a clutch. Thus fifty-two of the commonest birds are described in the three parts, and for aid in recognition are divided into various groups.

"The Cultivation and Preparation of Para Rubber." By W. H. Johnson, F.L.S. Second edition. Rewritten and greatly enlarged. 8vo., 178 pp. (Crosby Lockwood, London, 1909.) 7*s.* 6*d.* net.

The number of books and periodicals published at the present time which deal with rubber production are symptomatic of the interest taken in this comparatively modern industry. The book under review brings up to date the information bearing on the practical work of cultivating the Para rubber tree (*Hevea brasiliensis*) and preparing the raw rubber for export. As the author states in his preface, new methods of collecting and preparing rubber are frequently being evolved, and in view of the industry's comparative infancy, there is every probability that what are to-day recognized as up-to-date or standard systems will in a few years be considered quite obsolete. The book opens with a short chapter on the history of Para rubber, its increase in value and the rapid extension of the areas devoted to Para rubber cultivation, more especially in British possessions in the East. The propagation and cultivation of the tree are next fully dealt with, the soils and manures found most suitable to its well-being discussed, and an account given of the pests (happily few) to which it is liable, and the best methods of combating them. Different planters have different methods of tapping the trees to procure the rubber-yielding latex, and arguments for and against these methods are given by the author. The treatment of the latex to procure the rubber and the various processes to which the latter is subjected before being ready for export are described in detail and fully illustrated. In this connection several machines and labour-saving appliances are figured and described, and suggested plans given for arranging a rubber factory.

An interesting chapter is that devoted to the description of the cost of establishing and maintaining a rubber plantation up to the seventh year of its existence, when tapping operations commence. Figures for plantations in Ceylon and the Malay Peninsula are given which serve as a guide, but the author is careful to point out that expenses vary in different countries according to the cost of labour, land, and transport.

The seeds of the rubber tree yield a drying oil which it is suggested will probably be heard more of in the future when the large number of cultivated trees reach a seed-bearing age.

The book is well printed and fully illustrated, and should prove of value to those desirous of obtaining practical information regarding the rubber planting industry.

"Dent's Scientific Primers." Various authors. Sm. 8vo. (Dent, London, 1909.) 1*s.* each net.

This is a series of scientific primers with exceedingly clear illustrations, particularly in the microscopical sections in the botany and biology primers, and in the drawings of apparatus in that on chemistry.

In the preface to the botany primer the author advises that the primers should be read in the following order: (1) Chemistry, (2) Biology, (3) Botany. This valuable advice to the beginner will save him great labour and disappointment.

The authors are masters of their respective subjects, and deal with them in such a way as to be understood by the veriest beginner who seeks for knowledge. That on chemistry is written by Professor Tilden, that on biology by Professor Harvey Gibson, and that on botany by Professor Reynolds Green.

"Fossil Plants." Sixty photographs illustrating the Flora of the Coal-measures. By E. A. Newell Arber, M.A., F.Z.S., F.G.S. 18mo., 75 pp. (Gowans & Gray, London, 1909.) 6*d.* net.

This little book consists of photographs of fossil plants from the Coal-measures, with a series of short non-technical descriptions by an eminent palaeobotanist at the end. We have spent many hours collecting specimens of these plants both above and underground, and we do not hesitate to say that the photographs are remarkably true and clear in every detail. It is a wonderful sixpennyworth.

"A First Book of Botany." By Elizabeth Healey, A.R.C.Sc. Sm. 8vo., 142 pp. (Macmillan, London, 1909.) 1*s.* 6*d.*

A "first book" of botany is one requiring the art of omission. When there is such a wealth of matter, the greater is the difficulty in so choosing as to cover the ground with regard to essentials, and yet be seasonal in arrangement. We think in this case the choice is well graduated, and the specimens, with one exception, easily obtainable. The practical work suggested at the end of each chapter is excellent.

Where matter and arrangement are so good, one is loth to complain; yet we think the illustration on p. 40 is far from clear, particularly the tubers and the roots. We would like to see the illustrations of the hazel and the birch, and in fact all the details of the trees mentioned, on a larger scale. It is a book we can strongly recommend to beginners in botany.

"Trees and Shrubs of the British Isles, Native and Acclimatised." By C. S. Cooper, F.R.H.S., and W. Percival Westall, F.L.S. 4to. Parts 2–11. 214 pp. in each. (Dent, London, 1909.) Each 1*s.* net.

The first part of this work was reviewed when published, and now ten further parts have appeared.

The greater parts of the numbers from two to seven are taken up with carefully prepared chapters on insect and fungoid pests and on insecticides and fungicides. As usual, the descriptions of the trees and shrubs are condensed and to the point, while the many beautiful illustrations, which have been prepared with the minutest care, cannot fail to render the book when completed a reference work of no mean order.

It must not be taken for granted that all the shrubs of which descriptions are given are hardy in every part of Great Britain, as several will only succeed in the warmest and most sheltered of seaside situations.

Altogether the work is one of which we cannot speak too highly, and in recommending it to the student we feel that the concise and accurate descriptions and beautifully executed illustrations will render recognition of our trees and shrubs by no means a difficult matter.

"London's Forest: Its History, Traditions and Romance." By Percival J. S. Perceval. 8vo., 280 pp. (Dent, London, 1909.) 3*s*. 6*d*. net.

This is a well got up and highly interesting account of Epping Forest, the only forest which is a heritage of the City of London. Its official connection with the Metropolis' romantic history, both topographical and historical, are stories lucidly and well told by the author, while the numerous illustrations will go far in whetting the appetite of the reader regarding this precious fragment of forest. The chapter on the "trees and the deer—the lopping and fuel rights and history of the deer" is well written, though to us who know the forest well it is always a source of regret that lopping should have been so extensively engaged in, for that it has been the direct cause of the early decay of many trees will be denied by none. However that may be, we have still left to us a forest of which we may well feel proud, whether for its historical connections or its great natural beauty.

We strongly recommend those who are at all interested in forest land to carefully peruse Mr. Perceval's remarks regarding this heritage of the citizens of London.

"The Battle of Land and Sea." By W. Ashton. 8vo., 211 pp. (Heywood, London, 1909.) Paper boards, 1*s*. 6*d*. net.

An interesting account of the origin and formation of the great line of sandhills on the Lancashire, Cheshire and North Wales Coasts, including besides much of interest in local history.

"Trees and Flowers of England and Wales." By H. G. Jameson. 8vo., 136 pp. (Simpkin, Marshall, London, 1909.) 2*s*. 6*d*. net.

This is a "key" by which the name of any native flowering plant, not a grass or sedge, may be ascertained with ease. It differs from other keys in being profusely illustrated by clear, though small, sketches, illustrating the principal points of importance in separating one plant from its near allies, and the points given in the key are stated in clear and simple language so that a reader with scarcely any knowledge of plants could hardly be at a loss to understand them. Anyone desiring to ascertain the name of any British plant will find this a most useful aid.

"The Nature Book." By various authors. 4to., 752 pp. (Cassell, London, 1908–09.) In 24 parts, 7*d*. each net.

The awakening of a more general interest in, and love of, natural surroundings, has led to the publication of a host of books, some very good, others not so good. The value of such books must be gauged, not so much by the information they supply, as by the effect they have upon their readers. They should awaken a desire to know more, and should stimulate them to find out more for themselves from the actual natural objects. Judged by this standard, the present book will not fail, for it treats of wild plants, of trees, and birds and beasts, of fish and insects, of gardens and the weather, and of many other such things in a clear and entertaining way, so that the nature-lover may verify for himself what is stated, and in the doing he may learn more of nature's hidden truths. The printing and general "get up" of the book is excellent, and the illustrations, both coloured and half-tone, are deserving of praise.

"Familiar Wild Flowers." By F. E. Hulme, F.L.S. New issue. Vol. I, 8vo., pp. 168. (Cassell, London, 1909.) In parts 6*d*. each net.

This is a reprint of a well-known popular work on British wild flowers, with (in all) 360 coloured illustrations of British wild plants and descriptive notes concerning each. Many quotations from old herbals and other old works are given.

"Pruning." Anon. 3½ × 10, 66 pp. (Lockwood Press, London, 1909.) 1*s*. net.

This is a revised reprint of a series of articles which first appeared in "The Fruit, Flower and Vegetable Trades' Journal." It is written for commercial fruit growers and contains an appendix treating of pruning from the standpoint of the small-holder.

Seldom have we seen a more excellent series of articles upon this difficult subject. The author is a practical fruit grower who has learned to make use of his eyes, to think carefully over what he has seen, and to draw accurate inferences from his observations. All sides of the subject so far as hardy fruit growing outdoors is concerned, are ably handled, and the author has good advice to give upon each. The present differs from many other books and articles dealing with pruning in that the author recognizes the fact that each variety of fruit has its own peculiar habit of growth and fruiting, and he deals with them accordingly, showing how the pruning is to be done, and why it is to be done in that particular way. This method of treatment makes the book of peculiar value to the commercial fruit grower, especially as the varieties dealt with are those that find the greatest favour in the market.

The tools to be used and such things as gloves, aprons, and so on suitable for use are dealt with, and the author, very properly, decries the use of secateurs. The knife, and occasionally the long-arm pruners, are the only tools required. Secateurs are clumsy and more liable to bruise the tree than the knife, making wounds difficult or impossible to heal.

The shape of the book is unusual and we think not very handy, and we hope the author will be induced to extend his work and publish it in another form, with perhaps larger illustrations. As it is, no commercial fruit grower should be without it.

CABBAGES AT WISLEY, 1908-09.

EIGHTY-SIX stocks of Cabbage were received for trial. All were sown on March 21, and when large enough the seedlings were planted out in ground that had been deeply dug and well manured. All the stocks germinated well, and the whole collection developed well. As the different varieties came into use at intervals the Committee examined them on several occasions.

F.C.C.=First Class Certificate.
A.M.=Award of Merit.

LIST OF VARIETIES.*

1. Best of All.
2. Dwarf Early Solid.
3. Early Etampes.
4. Early Flathead.
5. Early Offenham.
6. Early Pisan.
7. Enkhuizen Market.
8. Erfurt Dark Red.
9. Erfurt Round Sugar.
10. Improved Dwarf Nonpareil.
11. Little Queen.
12. Paris Market.
13. St. John's Day.
14. Tourlaville.
15. Vienna Early White.
16. Autumn Exhibition.
17. Autumn King.
18. Berlin Dark Red.
19. Christmas Drumhead.
20. Early Dwarf York.
21. Enkhuizen Glory.
22. Fottler's Improved Brunswick.
23. Garefield Red.
24. Giant Zittau Red.
25. Large Wakefield.
26. Large York.
27. Miniature Red.
28. Negro Head.
29. Newark.
30. Van der Gau.
31. Warren's Stone Mason.
32. Winnengstadt.
33. Zenith Rea.
34. Myatt's Early Evesham.
35. Shaw's Improved Nonpareil.
36. Prince's Improved Nonpareil.
37. Early Red.
38. First Crop.
39. St. John's Day.
40. East Ham.
41. Nonpareil Dwarf.
42. Selected Offenham.
43. Wheeler's Imperial.
44. Express.
45. Early York.
46. Etampes.
47. Auvergne Quintal.
48. Fottler's Improved Brunswick.
49. Large Red Drumhead.
50. Paris Market.
51. St. Denis.
52. Schweinfurt Quintal.
53. Vangirard Winter.
54. Winnengstadt Early.
55. Savoy Extra Early Midsummer.
56. Roblett Dwarf.
57. Winter Drumhead.

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* All trials in the Wisley Garden are carried out under numbers only until judging is completed. The number prefixed to the name of the variety in the Report corresponds with that by which alone the variety was known until judgment had been given. Fellows visiting the Garden and noticing any plant under a number can easily ascertain its name later by reference to the Report in the Journal.

58. Large Aubervilliers.
59. Bellamy's Nonpareil.
60. Early Offenham.
61. Enfield Market.
62. First Crop.
63. Large Nonpareil.
64. Market Garden.
65. Morden's Imperial.
66. Small Nonpareil.
67. Veitch's Incomparable.
68. Wheeler's Imperial.
69. All Heart.
70. Earliest.
71. Improved Nonpareil.
72. Little Gem.
73. Summer Drumhead.
74. Tender and True.
75. Christmas Drumhead.
76. St. John's Day.
77. Earliest of All.
78. Flower of Spring.
79. Earliest.
80. Dwarf Red Gem.
81. First Early.
82. Pearson's Conqueror.
83. Etampes.
84. Brown's Early.
85. Loseley Gem.
86. Treseder's Selected.

69. All Heart, **A.M.** August 25, 1908 (Sutton).—Sugar-loaf type; plant fairly large, vigorous; growth spreading; leaves rather large, long, thin, curved outwards; veins coarse, slightly glaucous, smooth; head moderate size, acutely pointed, firm, quickly spoils. A good variety for home use, but does not stand well.

16. Autumn Exhibition, **A.M.** August 25, 1908 (Barr).—Drumhead type; plant of medium size, vigorous, healthy; growth spreading, rather loose; leaves of medium size, slightly crenate, thick, dark green; head nearly round, of fair size, firm; stands well. One of the best of this type.

17. Autumn King (Barr).—A very large coarse form of Drumhead. The Committee condemned all this large type as being quite unsuited for our gardens.

47. Auvergne Quintal (Vilmorin).—Very similar to No. 17.

59. Bellamy's Nonpareil (J. Veitch).—A form of No. 38.

18. Berlin Dark Red (Barr).—See No. 8.

1. Best of All (Barr).—See No. 44.

84. Brown's Early (Staward).—Evesham type, stock not fixed.

19, 75. Christmas Drumhead, **A.M.** December 12, 1893 (Sydenham, Barr).—A rather flat obtuse form of No. 16, and later in coming into use.

2. Dwarf Early Solid (Barr).—A very compact form of No. 16.

80. Dwarf Red Gem (Dobbie).—A good form of No. 18.

70. Earliest, **A.M.** June 17, 1897 (Sutton).—Very similar to No. 44.

77. Earliest of All (R. Veitch).—Same as No. 44.

79. Earliest (Dobbie).—Distinct from No. 70. See No. 34.

20. Early Dwarf York (Barr).—A form of No. 69.

3. Early Etampes (Barr).—Very similar to No. 20.

4. Early Flathead (Barr).—Very similar to No. 16.

5, 60. Early Offenham (Barr, J. Veitch).—A form of No. 34.

6. Early Pisan (Barr).—A spreading form of No. 16, with a solid head which quickly bursts and spoils.

37. Early Red (Johnson).—See No. 8.

45. Early York (Vilmorin).—Similar to No. 69.

40. East Ham Selected (Sharpe).—See No. 34.

61. Enfield Market (J. Veitch).—A strong growing form of No. 34.

21. Enkhuizen Glory (Barr).—Very similar to No. 17.

7. Enkhuizen Market (Barr).—A dark-leaved form of No. 17.

8. Erfurt Dark Red, **A.M.** August 25, 1908 (Barr).—Plant compact, erect in habit, rather small, healthy; leaves small, dark red; heads small, very solid, fine colour. A fine true stock.

9. Erfurt Round Sugar (Barr).—A fine medium-sized form of No. 16.

46, 83. Etampes, **A.M.** August 25, 1908 (Heinemann, Vilmorin).—Plant rather small; growth compact, erect; foliage of medium size, dark green; heads of moderate size, acutely pointed, and much elongated, firm, quickly coming into use. Very similar to No. 69. Both stocks were excellent.

44. Express, **F.C.C.** July 9, 1888 (Vilmorin).—A very fine stock of what the Committee termed "The White Heart" type. Plant of medium size, compact, with a moderate spread of outer leaves, which are rather small and light green; head of medium size, somewhat obtusely pointed, heavy, and very solid, almost white, coming into use very quickly, and standing fairly well. A valuable and useful type.

55. Extra Early Midsummer Savoy (Vilmorin).—A very good compact growing early variety of the Dwarf Ulm type with a solid, rather small head, very firm, and standing well.

38, 62. First Crop, **A.M.** August 25, 1908 (Johnson, J. Veitch).—Plant rather small, healthy, compact, with a fair spread of outer leaves; small but broad; dark green colour; heads medium to small, elongated, very firm; comes into use quickly, and soon spoils. Nonpareil type.

81. First Early (Bunyard).—See No. 34.

78. Flower of Spring (R. Veitch).—See No. 34.

22, 48. Fottler's improved Brunswick (Vilmorin, Barr).—A very flat form of Drumhead.—See No. 17.

23. Garefield Red (Barr).—This may be described as a big red Drumhead variety, too large and coarse for use in private gardens.

24. Giant Zittau Red (Barr).—Very similar to No. 23.

71. Improved Nonpareil (Sutton).—Very similar to Nos. 38, 62.

10. Improved Dwarf Nonpareil (Barr).—See Nos. 38, 62.

58. Large Aubervilliers (Vilmorin).—See No. 17.

63. Large Nonpareil (J. Veitch).—A large form of Nos. 38, 62.

49. Large Red Drumhead (Vilmorin).—A gigantic red form of No. 17.

26. Large York (Barr).—See Nos. 46, 83.

25. Large Wakefield (Barr).—See No. 34.

72. Little Gem (Sutton).—See Nos. 38, 62.

11. Little Queen (Barr).—A small compact form of Nos. 38, 62.

85. Loseley Gem (Staward).—Very similar to 44.

64. Market Garden (J. Veitch).—See Nos. 38, 62.

27. Miniature Red (Barr).—A small form of No. 28.

65. Morden's Imperial (J. Veitch).—See No. 34.

34. Myatt's Early Evesham, **A.M.** August 25, 1908, (Nutting).—Plant of medium size, healthy, moderately compact, with rather large outer leaves; head of medium size, elongated, firm, of fair size, quickly coming into use, well blanched standing well. A good useful type.

28. Negro Head (Barr).—This is the old type of Red Cabbage, tall growing, with a rather large spread of outer leaves and a round, firm solid head of good colour.

29. Newark (Barr).—A medium-sized form of No. 17 coming into use early.

41. Nonpareil Dwarf Selected (Thorpe).—See Nos. 38, 62.

12, 50. Paris Market (Barr, Vilmorin).—See No. 44.

82. Pearson's Conqueror (Bunyard).—An excellent form of No. 34.

36. Prince's Improved Nonpareil (Nutting).—See Nos. 38, 62.

56. Roblett Dwarf (Vilmorin).—A small and early form of No. 17.

51. St. Denis (Vilmorin).—A very large form of No. 17.

13, 39, 76. St. John's Day, **A.M.** September 10, 1895 (Barr, Johnson, Sydenham).—This is one of the best of the Drumhead type, the plant being of medium size, with a rather small, solid head of good colour, and standing well without bursting, coming into use quickly, and withstanding frost.

52. Schweinfurt Quintal (Vilmorin).—A very large form of No. 17.

42. Selected Offenham (Thorpe).—See No. 34.

35. Shaw's Improved Nonpareil (Nutting).—See Nos. 38, 62.

66. Small Nonpareil (J. Veitch).—A selected dwarf form of Nos. 38, 62.

73. Summer Drumhead (Sutton).—A very large early form of No. 17.

74. Tender and True (Sutton).—See No. 44.

14. Tourlaville (Barr).—A large form of No. 34.

86. Treseder's Selected Early (Treseder).—A very good selection of Nos. 38, 62.

30. Van der Gau (Barr).—See No. 17.

53. Vangirard Winter (Vilmorin).—A rather small compact form of No. 17.

67. Veitch's Incomparable (J. Veitch).—A fine true stock of No. 34.

15. Vienna Early White (Barr).—An early form of No. 17.

31. Warren's Stone Mason (Barr).—See No. 17.

43, 68. Wheeler's Imperial Selected, **A.M.** August 25, 1908 (Thorpe, J. Veitch).—A very good stock of Nos. 38, 62.

32, 54. Winnengstadt, **A.M.** September 10, 1895 (Barr, Vilmorin).—This old variety is too well known to need any description; both stocks excellent.

57. Winter Drumhead (Vilmorin).—See No. 17.

33. Zenith Red (Barr).—See No. 28.

LETTUCE AT WISLEY, 1909.

One hundred and thirteen stocks of Cabbage lettuce, and forty-one stocks of Cos lettuce were received for trial, the former being sown on April 26, the latter on May 3. In almost every case the germination was excellent, the cool damp season suiting the hot sandy soil admirably. Although the ground had only been moderately manured, the whole collection was so good that the Fruit and Vegetable Committee wished it to be recorded in the Report that it was the finest trial they had ever seen. Many stocks under different names were so much alike that it was impossible to detect any difference, consequently they are referred to the type. As the various stocks came into use they were examined by the Committee.

F.C.C.=First Class Certificate.
A.M.=Award of Merit.
XXX=Highly Commended.

Cabbage Lettuce.

*1. A 1 (Sutton).—A large green coarsely crinkled variety of the Drumhead type; dark green leaves; heart solid and firm; stock true.

2. A 1 (Cannell).—A small slow growing variety of the Tennis Ball type.

3. Acquisition (J. Veitch).—A good variety of the All the Year Round type; dark green leaves; firm solid heart; makes a useful lettuce.

4. All Heart (Massey).—A large coarsely crinkled variety of the Drumhead type; stock requires more selection.

5, 6, 7, 8. All the Year Round (J. Veitch, Nutting, Carter, Barr).—A very fine form of this type; even grower of pale green colour, with firm, solid heart.

9. American Gathering (Carter).—A strong-growing variety of the Drumhead type, loose open grower; considered useless by Committee.

10. American Green (Carter).—Considered useless by Committee.

11. Australian (Pfitzer).—A strong growing variety of the Drumhead type, with bronzy-green leaves; makes a firm heart; stock true.

12. Bismarck (Pfitzer).—A variety of Passion Lettuce; type considered useless by Committee.

13. Brown Batavian (Carter).—A slow growing variety of the Drumhead type; not a desirable variety.

14. Brown Dutch (Carter).—A variety of the Ice Lettuce type; considered useless by Committee.

15. Brown Trotzkopf (Pfitzer).—Compact grower of the Continuity type; rather loose heart.

16. Buttercup (Carter).—Considered useless by Committee.

17. Chou-de-Naples (Dammann).—Considered useless by Committee.

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* See footnote, p. 262.

18, 19, 20. Continuity, **A.M.** June 20, 1901 (Nutting, R. Veitch, Carter).—A strong growing variety, with deep bronze coloured leaves; makes a large lettuce with good firm heart.

21. Commodore Nutt (Sutton).—A rather weak growing variety of the Tom Thumb type; hearts firm but small.

22. Crystal Palace, **F.C.C.** July 26, 1898 (J. Veitch).—Strong grower with coarsely crinkled leaves, tinged with bronze; hearts slowly and firmly, and withstands drought well.

23. Dannhauser (Pfitzer).—Good grower of the All the Year Round type; colour pale green, with firm solid heart.

24. Drumhead (J. Veitch).—A strong grower with coarsely crinkled leaves; open spreading habit, but makes a large solid lettuce.

25. Drumhead Selected (Barr).—Similar to No. 24.

26. Duke of Cornwall, **A.M.** July 5, 1901 (R. Veitch).—An excellent variety of the Drumhead type, with rough crinkled leaves; makes a large solid head; stock true.

27. Earliest of All (Sutton).—Tom Thumb type, but flowered without hearting.

28. Early Brown Speckled (Spruyt).—Considered undesirable by Committee.

29. Early Golden Stonehead (Spruyt).—A compact grower of the Tom Thumb type, with yellowish-green leaves; makes a firm heart and turns in quickly.

30. Early Paris Market (Carter).—An excellent lettuce of the Tom Thumb type; blotched with brown; turns in quickly and makes a good firm heart.

31. Early White Spring (Carter).—A medium grower of the All the Year Round type; stock true.

32. Emerald (Harrison).—A large variety of the Unctuous type with large firm heart; stock very true.

33. Excelsior (Harrison).—A good variety of the All the Year Round type; pale green leaves; makes a good heart which stands long before running to seed.

34, 35. Favourite (J. Veitch, Sutton).—Considered undesirable by Committee.

36. German Giant (Spruyt).—An excellent lettuce of the All the Year Round type, with a good firm heart.

37. Giant, **XXX** August 3, 1909 (Sutton).—A large, excellent variety of the All the Year Round type; makes a solid, firm heart and does not run to seed quickly.

38. Giant Crystal (Pfitzer).—A bronzy coloured variety of the Drumhead type; makes a useful lettuce.

39. Golden Ball (Sutton).—A variety of the Tom Thumb type, which turns in quickly, and quickly runs to seed.

40. Golden Dutch (curled leaves) (Spruyt). Considered undesirable, as it never hearts.

41. Golden Dutch (round-leaved) (Spruyt).—See No. 40.

42. Golden Queen (Nutting).—An excellent little lettuce of the Tom Thumb type, with firm hearts; turns in very quickly.

43. Green Favourite (Barr).—A good lettuce of the All the Year Round type, with dark green leaves; makes a firm heart; stock true.

44. Green Fringed (Barr).—Considered by Committee to be useless.

45. Harbinger (Carter).—A poor stock of the Malta type, with pale greenish-yellow, coarsely crinkled leaves.

46. Harbinger Forcing (Barr).—Similar to No. 45.

47. Heartwell, **XXX** August 3, 1909 (Sutton).—An excellent variety of the All the Year Round type, with dark green leaves; makes good solid, firm heart; stock true.

48. Holborn Standard (Carter).—A very useful lettuce of the Drumhead type, with pale green, slightly bronzed leaves; hearts quickly; stock true.

49, 50. Iceberg (Nutting, Carter).—Similar to No. 48.

51. Icehead (Barr).—A poor stock of the All the Year Round type; loose, open grower.

52. Iceleaf, **A.M.** August 13, 1895 (R. Veitch).—An excellent lettuce of the Drumhead type, with roughly crinkled leaves tinged with bronze; makes a fine solid heart.

53. Ideal (Sutton).—An excellent variety of the All the Year Round type; leaves pale green tinged with bronze; makes a firm, solid heart and turns in quickly.

54. Ideal Forcing (Heinemann).—A variety of Tom Thumb type, which runs to seed quickly.

55. Immensity (Carter).—A slow hearting variety of the All the Year Round type, with dark green leaves blotched with brown; loosely folding hearts.

56. Imperial Green (J. Veitch).—A useful variety of the Tom Thumb type, with tightly folding hearts.

57. Kaiser Wilhelm II. (Pfitzer).—A spreading variety of the Passion type, hearting slowly; stock true.

58. Large Beaulieu (Vilmorin).—Considered by Committee undesirable.

59. Large White Stone (summer) (Vilmorin).—A loose-growing variety of the All the Year Round type, with pale green leaves.

60. Large White Winter (Vilmorin).—Same type as No. 59, but made no heart before seeding.

61. Lee's Immense (Carter).—A variety of the All the Year Round type, which runs to seed before hearting.

62. Little Gem, **A.M.** June 20, 1901 (Barr).—An excellent variety of the Tom Thumb type, with yellowish-green leaves; hearts quickly; stock even and true.

63. Lombardy Iceleaf (R. Veitch).—Drumhead type; stock requires more selection.

64. Longstander (Carter).—A pale green lettuce of the Drumhead type, which runs to seed early.

65. Longstander (Nutting).—A nice little lettuce of the All the Year Round type, with firm hearts.

66. Magnificent (Harrison).—Considered by Committee undesirable.

67. Madeira Large (Vilmorin).—A winter lettuce which runs to seed quickly.

68, 69. May King (Heinemann, Carter).—An excellent lettuce of the All the Year Round type; leaves edged with pink; makes a firm heart and turns in quickly.

70. Marvel (Vilmorin).—A slow-growing variety of the Continuity type; withstands the drought well.

71. Marvel of Stuttgart (Pfitzer).—A variety of the Late Unctuous type; pale green leaves, loosely folding, with moderately firm heart.

72. McHattie's Giant (Carter).—Similar to Nos. 59 and 60.

73. Miniature (Carter).—A small-growing variety of the Tom Thumb type, with dark green leaves tinged with bronze; small firm heart.

74. Nansen (Carter).—A variety of the All the Year Round type; makes a moderately firm heart; stock true.

75, 76. Neapolitan (J. Veitch, Vilmorin).—A good lettuce of the Drumhead type; dark green crinkled leaves; makes a firm heart; stock true.

77. New York (Carter).—Similar to Nos. 75 and 76.

78. Nonpareil (Vilmorin).—A stock of the Drumhead type; considered by Committee as undesirable.

79, 80. Nonpareil (Carter, J. Veitch).—An excellent lettuce of the Drumhead type, with coarsely crinkled pale green leaves and firm, solid heart.

81. Palatine (Vilmorin).—A moderately even stock of Passion lettuce type; a variety not much grown in England.

82. Paragon (Barr).—A fine lettuce of the All the Year Round type; pale green leaves and good firm heart; stock true.

83. Paris Market Forcing (Vilmorin).—Tom Thumb type; runs to seed very quickly.

84. Perpignan (Carter).—Similar to No. 82.

85. Perpetual (Carter).—A variety of the Drumhead type; yellowish-green leaves; considered undesirable by Committee.

86. Precocity (Barr).—Similar to No. 83.

87. Rotterdam Market (Spruyt).—An excellent lettuce of the All the Year Round type; leaves pale green, with large, solid heart; stock very true.

88. Royal Albert (J. Veitch).—Considered by Committee useless.

89. Royal Malta, **A.M.** August 13, 1895 (Harrison). A roughly crinkled form of the Drumhead type; a very even grower, making large solid heart.

90. Satisfaction, **A.M.** August 13, 1895 (Sutton).—A really good form of the Continuity type; leaves deep bronze; hearts large and solid.

91. Satisfaction, **A.M.** August 13, 1895 (Heinemann).—A fine lettuce of the All the Year Round type; leaves pale green; hearts solid and firm; stands well.

92. Simpson Curled (Carter).—A roughly crinkled variety of the Drumhead type; yellowish-green leaves, with moderately firm heart.

93. Solidhead Red Speckled (Spruyt).—An even-growing variety of the Passion type.

94. Standwell (Sutton).—A useful lettuce of the All the Year Round type; makes a solid heart and stands well.

95. Stonehead (Heinemann).—A very compact tight-growing variety of the Tom Thumb type; makes a firm heart; hearts quickly.

96. Stuttgart Dauerkopf, **XXX** August 3, 1909 (Pfitzer).—An excellent variety of the All the Year Round type; makes a large, solid heart, and stands well.

97. Stuttgart Forcing Improved (Pfitzer).—Similar to No. 94.

98. Summer Gem (J. Veitch).—Considered by Committee undesirable.

99. Supreme (Sutton).—A coarsely crinkled variety of the Drumhead type; leaves tinged with bronze; making a solid heart.

100. The New Yorker (Barr).—Similar to No. 75.

101. Tom Thumb (Wheeler's), **A.M.** June 20, 1901, as a forcing variety (Carter).—An excellent lettuce; makes small, firm head; useful for frame or garden.

102. Tom Thumb, Improved (Sutton).—See No. 101.

103. Tom Thumb, Extra Selected (Barr).—See No. 101.

104. Tremont Winter (Vilmorin).—Considered by Committee undesirable.

105. Victoria (Carter).—A good lettuce of the All the Year Round type; leaves dark green; hearts solid; stock true.

106. White Batavian (Vilmorin).—Similar to No. 99.

107. White Favourite (Barr).—A variety of the All the Year Round type; stock requires more selection.

108. White Marvel of Cazard, **A.M.** August 13, 1895 (Vilmorin).—A good lettuce of the All the Year Round type; makes a nice useful head; stock true.

109. Winter Gathering (Sutton).—Considered by Committee undesirable.

110. Wonder of Stuttgart (R. Veitch).—Similar to No. 96.

The following were entered as Cos Lettuce and were grown in company with them.

20. Gonezzano (Dammann).—Continuity type Cabbage lettuce.

26. King (Harrison).—A Cabbage lettuce of the Drumhead type.

43. White Giant (Dammann).—A Cabbage lettuce of the All the Year Round type.

Cos Lettuce.

1. Asparagus (Carter).—Considered useless by Committee.

2. Baldwin, **XXX** August 3, 1909 (Carter).—An excellent lettuce; self-folding; hearts large, solid, and white; stock even and true.

3. Bath or Brown (Carter).—A good variety of the Cos type, but better for autumn sowing.

4. Bath or Brown Sugarloaf (J. Veitch).—Similar to No. 3.

5. Bath or Brown, Selected (J. Veitch).—Similar to No. 3.

6. Bunney's Incomparable Green (Carter).—Considered useless by Committee.

7. Chesnay Large White (Grosse blonde du Ches.), **XXX** August 3, 1909 (Vilmorin).—An excellent lettuce of the Cos type; self-folding; makes a large, solid head; stock very true.

8. Covent Garden Summer White, **XXX** August 3, 1909 (Barr).—A fine large lettuce of the Cos type, with a tightly folding self-hearting habit; makes a large solid head; stands well.

9. Covent Garden Winter Brown (Barr).—Considered useless by Committee.

10. Covent Garden Winter White (Barr).—See No. 9.

11. Dunnett's Giant Bath (Carter).—Considered useless by Committee.

12, 13. Dwarf Perfection (Sutton, Barr).—A very dwarf variety of the Cos type: hearts quickly, self-folding, with firm head; colour dark green.

14, 15. Eclipse (Harrison, Veitch).—Similar to No. 12.

16. Emerald Queen, **XXX** August 3, 1909 (Barr).—A fine variety of the Cos type; makes immense heads, self-folding; hearts white and firm, and stands well.

17. Express (Heinemann).—A useful lettuce; turns in quickly.

18. Giant White (Carter).—A large lettuce of the Cos type; matures slowly.

19. Golden Yellow (Heinemann).—Considered useless by Committee.

21. Grey Paris, **A.M.** August 13, 1895 (Vilmorin).—An excellent large lettuce of the Cos type; makes a large, solid head, self-folding; stands well; stock true.

22. Hardy Winter White (Nutting).—A good type of Cos lettuce; best suited for autumn sowing.

23. Immense Green, **XXX** August 3, 1909 (Harrison).—An excellent lettuce of the Cos type; heads large and firm, with a tight self-folding habit; stands well; stock even and true.

24, 25. Jumbo, **A.M.** July 5, 1901 (Barr, Carter).—A useful lettuce of the Cos type; makes a nice firm head, with solid, firm heart; stands well; stock true.

27. Kingsholm (Carter).—A good variety of the Cos type; makes a useful lettuce.

28, 29. Little Gem or Sucrine (J. Veitch, Sutton).—Considered by Committee as undesirable.

30. Long-standing White (Barr).—Similar to No. 28.

31. Mammoth White (Sutton).—An exceedingly large lettuce of the Cos type; makes a solid, firm heart; has a self-folding habit, and stands well.

32. Nonsuch (Sutton).—Considered by Committee undesirable.

33. Northern King (Carter).—See No. 32.

34. Paris Early, **XXX** August 3, 1909 (J. Veitch).—A very fine lettuce of the Cos type; makes a good, firm heart; is self-folding; stands well; stock true.

35. Peerless (Sutton).—A good lettuce of the Cos type; makes a large, round heart, and remains a long time fit for use.

36. Prince of Wales (Nutting).—See No. 27.

37, 38. Sugarloaf (Nutting, Carter).—Considered by Committee undesirable.

39. Summer White (Massey).—A very useful lettuce; stands well, and makes a good heart.

40. Superb White (Sutton).—Similar to No. 39.

41. The Barnum (Barr).—Considered by Committee useless.

42. Trianon Early White (Vilmorin).—Similar to No. 27.

44. White Heart (Sutton).—A very large lettuce of the Cos type; makes a very large head, and stands well.

EXAMINATIONS IN HORTICULTURE, 1909.*

GENERAL EXAMINATION,

Wednesday, April 21, 1909.

Seniors: over 18 years of age.

One hundred and fifty-one senior candidates entered, of whom 19, or upwards of 12 per cent., obtained a place in the first class; 69, or upwards of 45 per cent., gained a second class; and 60, or nearly 40 per cent., are placed in the third class. Three candidates only failed to satisfy the examiners.

In addition to these, four students resident in India entered for the examination, the questions set by the other examiners being specially adapted to India by the kind assistance of Lieut.-Colonel Prain, F.R.S., and of these four candidates three obtained a second class and one failed altogether.

In their report to the Council the examiners (the Rev. Professor George Henslow, M.A., V.M.H., &c., and Mr. James Douglas, V.M.H.), lay stress on the fact that the answers to the questions on the "Principles of Horticulture" were very satisfactory, especially those on Physiology, which were certainly the most important, and which, they are glad to say, were generally answered. The examiners also report that they were pleased to find that several of the candidates were well instructed in the somewhat new subjects of Ecology and Mendelism.

It is necessary, however, to again urge the importance of candidates studying the instructions printed at the head of their paper, before beginning to answer the questions. Fourteen candidates, for example, attempted to answer all the eight questions in "Operations and Practice," instead of confining themselves (as they were instructed) to four, and it is surely needless to say that four answered well are far better than eight answered poorly. In some cases, again, candidates were so prolix in their answers—had so much to say—that they only left themselves time to reply to three questions instead of to four. It is therefore necessary to urge again the importance of candidates practising conciseness in answering questions, otherwise they waste their own time and the examiners' also. The questions on "Practice" were for the most part very well answered.

Juniors: under 18 years of age.

Although the same questions were this year set to the Juniors as to the Seniors, an entirely different standard was looked for in their replies.

One hundred and forty junior candidates entered, of whom 17, or upwards of 12 per cent., have been placed in the first class; 41, or 30 per cent., in the second; and 60, or nearly 43 per cent., in the third; 22 failed altogether.

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* See also p. 92.

With regard to "Principles" the examiners report that as a rule it was only quantity and not quality that was deficient. As far as the students had learnt there were no serious mistakes, and the answers, in fact, were distinctly encouraging.

In "Operations and Practice," again, the examiners report that, considering the age of the candidates, the answers were very satisfactory, and they specially note that many of them showed a very fair knowledge of the different kinds of manures and of their application to the different kinds of soils.

The fact of 22 failures out of 140 should not discourage the students from trying again; all the examiners look for is a quite elementary knowledge of the "Principles" and a fair general acquaintance with "Operations and Practice."

W. Wilks, *Secretary.*

SENIORS.

Class I.

1. Frost, S. N., Thatcham Fruit Farm, Henwick, Newbury.
MacCaig, J. W., R.H.S. Gardens, Wisley, Ripley, Surrey.
3. Iveson, A. R., 67 High Street, Shirley, Southampton.
Milne, M. K., Horticultural College, Swanley.
5. Bigge, F. W., Kingsbury Road, Tyburn, near Birmingham.
Burnicle, J. W., 8 The Knoll, Sunderland.
Oswald, E. K., Studley College, Warwickshire.
Miles, W., R.H.S. Gardens, Wisley, Ripley, Surrey.
9. Deacon, M. A., Thatcham Fruit Farm, Newbury.
Johns, E. L. M., University College, Reading.
Macleod, C., University College, Reading.
Mayhew, C. W., 11 Claribel Road, near Brixton.
Yandell, W., Longford Castle Gardens, Salisbury.
14. Bramwell H., Studley College, Warwickshire
Goldie, M. V., Studley College, Warwickshire.
Harrison, N. B., Horticultural College, Swanley.
Kirby, V., Horticultural College, Swanley.
Lodge, W. H. H., 3 Viewfield Cottages, Muswell Hill, N.
Snowden, J. D., The Gardens, Shakenhurst, Cleobury Mortimer.

Class II.

1. Gibson, R., Silksworth House Gardens, near Sunderland.
Kent, W. G., R.H.S. Gardens, Wisley, Ripley, Surrey.
Laird, H., University College, Reading.
Turner, A., Essex County School of Horticulture, Chelmsford.
5. Beattie, R., The Hollies, Astley, Manchester.
Byles, H. C. Thatcham Fruit Farm, Newbury.
Faber, F., Essex County School of Horticulture, Chelmsford.
Hymans de Tiel, S. E., Horticultural College, Swanley.

Robson, H. L., R.H.S. Gardens, Wisley, Ripley, Surrey.
5. Simmonds, A., R.H.S. Gardens, Wisley, Ripley, Surrey.
Waring, F. J., 20 Moreley's Hill, Burton-on-Trent.
Abbiss, H. W., R.H.S. Gardens, Wisley, Ripley, Surrey.
Ainsworth, A., The Avenue, Old Sharlston, Wakefield.
Gibbs, G. M., 21 High Bank Road, Winshill, Burton-on-Trent.
Grimwood, M. B., Thatcham Fruit Farm, Newbury.
12. Hemsley, C. G., University College, Reading.
Jameson, E. A., Horticultural College, Swanley.
Jelley, H., Ashmore Farm, Long Buckby, Rugby.
Wake-Walker, M. E., Thatcham Fruit Farm, Newbury.
White, A. H. J., 21 St. Mary's Grove, Richmond, Surrey.
Brickenden, A. V., Studley College, Warwickshire.
Brooks, G. A. S., R.H.S. Gardens, Wisley, Ripley, Surrey.
Cockram, V., 19 Rosenau Road, Battersea Park, S.W.
21. Eddie, H. M., Glenapp Castle Gardens, Ballantrae, N.B.
Hunt, R. M., Essex County School of Horticulture, Chelmsford.
Middlemiss, T. J., 51 Clements Road, Bermondsey.
Rivington, J. S., Combe Villa, Combe Down, Bath.
Woods, E. E. K., Horticultural College, Swanley.
Bolton, H. E., University College, Reading.
Hopkins, R. E., Horticultural College, Swanley.
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2. Briant, S., G. Botanic Gardens, Saharanpur, India.
3. Khan, M. A., G. Botanic Gardens, Saharanpur, India.

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53. Mayes, W., Kerrison School, Thorndon, Eye, Suffolk.
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EXAMINATION OF SCHOOL TEACHERS IN COTTAGE AND ALLOTMENT GARDENING.

April 28, 1909.

A few candidates gave serious trouble to the examiners not only by mixing up their papers without reference to numerical order, but also in several instances by beginning replies in Section B upon the same paper as Section A. It is most important for every candidate to read *carefully* the instructions printed above the questions and follow them exactly. In numerous instances candidates sacrificed time by unduly elaborating their early replies. The best work was found, as is always the case, where both clearness and conciseness were combined with evidence of practical knowledge.

The Examiners, Mr. A. Dean, V.M.H., Mr. F. J. Chittenden, F.L.S., and Mr. Jas. Hudson, V.M.H., report that in very few cases did there seem to be any practical knowledge of "budding" in the creation of fruit trees, grafting being almost solely in the minds of the candidates. In some instances both Fruit-trees and Raspberries were credited with being propagated from cuttings. The term "planting" was frequently applied to seed sowing. Considerable confusion as to what constitutes hardiness in plants prevailed. Annuals also were strangely mixed with Herbaceous Plants.

Whilst the replies, generally, with regard to School-Garden plots, were satisfactory, great divergence as to their dimensions prevailed. This probably arose from the diverse sizes of these plots in various localities. Some of the candidates had evidently taken note of the latest regulations that have been issued and benefited thereby.

The treatment of neglected gardens—a most important feature—was in some few cases treated well, and in a practical manner.

The answers to the questions dealing with the Principles of Horticulture were, on the whole, more satisfactory than last year. The subject of manures, other than farmyard manure, is, however, one that appears to require more study, and the importance of hoeing as an aid to the retention of water in soils was too often overlooked.

More attention to simple illustrative experiments, simple enough to be grasped by intelligent children of school age and sufficiently to the point to illustrate the matters dealt with, would be well repaid.

In the answers to the last question the deep significance of the fact that the seed is the result of the union of two entities; the consequent probability of considerable variation from the characters of the seed-bearing parent; the probable chances of survival in a changing environment and the possibly increased capacity of the seedlings for availing themselves of opportunities for colonizing new situations—all these were almost entirely ignored. The difference also between the tuberous-root of the dahlia and the tuber of the potato seems to have been noticed by few, and yet in the garden the treatment of these two common plants is intimately connected with the differences in structure.

Generally speaking, however, the knowledge evinced in the majority of papers presented to the Examiners must, when imparted to the scholars, be productive of good results to their future well-being; and it is most satisfactory to know that the possession of these Certificates of qualification to teach Cottage and Allotment Gardening is being so widely recognized by the Managers of Schools throughout the country.

W. Wilks, *Secretary.*

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NOTES ON RECENT RESEARCH

AND

SHORT ABSTRACTS FROM CURRENT PERIODICAL LITERATURE, BRITISH AND FOREIGN,

AFFECTING

HORTICULTURE & HORTICULTURAL SCIENCE.

JUDGING by the number of appreciative letters received, the endeavour commenced in volume xxvi. to enlarge the usefulness of the Society's Journal, by giving an abstract of current Horticultural periodical literature, has met with success. It has certainly entailed vastly more labour than was anticipated, and should therefore make the Fellows' thanks to those who have helped in the work all the more hearty.

There are still, we feel, some departments of Horticulture and Horticultural Science very imperfectly represented in these abstracts, and the Editor would be grateful if any who have time at command, and who are willing to help in any special direction in this work, would communicate with him. He desires to express his most grateful thanks to all who co-operate in the work, and he ventures to express the hope that they will all strictly adhere to the general order and scheme of working, as the observance of an identical *order* can alone enable the Editor to continue to cope with the work. The order agreed on is as follows :—

1. To place first the name of the plant, disease, pest, &c., being noticed; and in this, the prominent governing or index word should always have precedence.

2. To place next the name, when given, of the author of the original article.

3. Then, the abbreviated form of the name of the journal, &c., in which the original article appears, taking care to use the abbreviation which will be found on pp. 264, 265.

4. After this, a reference to the number, date, and page of the journal in question.

5. If an illustration be given, to note the fact next, as "fig.," "tab.," or "plate."

6. After these preliminary necessities for making reference to the original possible for the reader, the abstract or digest should follow, ending up with the initials of the contributor affixed at the close of each Abstract or Note.

NAMES OF THOSE WHO HAVE KINDLY CONSENTED TO HELP IN THIS WORK.

Baker, F. J., A.R.C.S., F.R.H.S.
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Veitch, Harry J., F.L.S., F.Z.S., F.R.H.S.
Voss, W. A., F.C.S., F.R.H.S.
Webster, A. D., F.R.H.S.
Welby, F. A., F.R.H.S.
Williams, S. E., F.R.H.S.
Wilson, Gurney, F.L.S., F.R.H.S.

JOURNALS, BULLETINS, AND REPORTS

from which Abstracts are made, with the abbreviations used for their titles.

Journals, &c.	Abbreviated title.
Agricultural Gazette of New South Wales	Agr. Gaz. N.S.W.
Agricult. Journal, Cape of Good Hope	Agr. Jour. Cape G.H.
Annales Agronomiques	Ann. Ag.
Annales de la Soc. d'Hort. et d'Hist. Naturelle de l'Hérault	Ann. Soc. Hé.
Annales de la Soc. Nantaise des Amis de l'Hort.	Ann. Soc. Nant. des Amis Hort.
Annales des Sciences Naturelles	Ann. Sc. Nat.
Annales du Jard. Bot. de Buitenzorg	Ann. Jard. Bot. Buit.
Annals of Botany	Ann. Bot.
Beiheft zum Botanischen Centralblatt	Beih. Bot. Cent.
Boletim da Real Sociedade Nacional de Horticultura	Bol. R. Soc. Nac. Hort.
Boletim da Sociedade Broteriana	Bol. Soc. Brot.
Botanical Gazette	Bot. Gaz.
Botanical Magazine	Bot. Mag.
Bulletin de la Société Botanique de France	Bull. Soc. Bot. Fr.
Bulletin de la Soc. Hort. de Loiret	Bull. Soc. Hort. Loiret.
Bulletin de la Soc. Mycologique de France	Bull. Soc. Myc. Fr.
Bulletin Department of Agricult. Brisbane	Bull. Dep. Agr. Bris.
Bulletin Department of Agricult. Melbourne	Bull. Dep. Agr. Melb.
Bulletin of the Botanical Department, Jamaica	Bull. Bot. Dep. Jam.
Bulletin of Bot. Dep. Trinidad	Bull. Bot. Dep. Trin.
Bulletino della R. Società Toscana d' Orticultura	Bull. R. Soc. Tosc. Ort.
Canadian Reports, Guelph and Ontario Stations	Can. Rep. G. & O. Stat.
Centralblatt für Bacteriologie	Cent. f. Bact.
Chronique Orchidéenne	Chron. Orch.
Comptes Rendus	Comp. Rend.
Department of Agriculture, Victoria	Dep. Agr. Vict.
Department of Agriculture Reports, New Zealand	Dep. Agr. N.Z.
Dictionnaire Iconographique des Orchidées	Dict. Icon. Orch.
Die Gartenwelt	Die Gart.
Engler's Botanische Jahrbücher	Eng. Bot. Jah.
Gardeners' Chronicle	Gard. Chron.
Gardeners' Magazine	Gard. Mag.
Gartenflora	Gartenflora.
Journal de la Société Nationale d'Horticulture de France	Jour. Soc. Nat. Hort. Fr.
Journal Dep. Agricult. Victoria	Jour. Dep. Agr. Vict.
Journal Imperial Department Agriculture, West Indies	Jour. Imp. Dep. Agr. W.I.
Journal of Botany	Jour. Bot.
Journal of Chemical Society	Jour. Chem. Soc.
Journal of Economic Biology	Jour. Econ. Biol.
Journal of Economic Entomology	Jour. Econ. Entom.
Journal of Horticulture	Jour. Hort.
Journal of the Board of Agriculture	Jour. Bd. Agr.
Journal of the Linnean Society	Jour. Linn. Soc.
Journal of the Royal Agricultural Society	Jour. R.A.S.
Journal S.E. Agricultural College, Wye	Jour. S.E. Agr. Coll.
Kaiserliche Gesundheitsamte	Kais. Ges.
Le Jardin	Le Jard.
Lebensgeschichte der Blutenpflanzen Mitteleuropas	Lebens. d. Blutenpfl.
Naturwiss. Zeitschrift Land und Forst	Nat. Zeit. Land-Forst.
Notizblatt des Königl. Bot. Gart. und Museums zu Berlin	Not. König. Bot. Berlin.
Orchid Review	Orch. Rev.
Orchis	Orchis.
Proceedings of the American Pomological Society	Am. Pom. Soc.

Journals, &c.	Abbreviated title.
Queensland Agricultural Journal	Qu. Agr. Journ.
Reports of the Missouri Botanical Garden	Rep. Miss. Bot. Gard.
Revue de l'Horticulture Belge	Rev. Hort. Belge.
Revue générale de Botanique	Rev. gén. Bot.
Revue Horticole	Rev. Hort.
The Garden	Garden.
Transactions Bot. Soc. Edinburgh	Trans. Bot. Soc. Edin.
Transactions of the British Mycological Soc.	Trans. Brit. Myc. Soc.
Transactions of the Massachusetts Hort. Soc.	Trans. Mass. Hort. Soc.
U.S.A. Department of Agriculture, Bulletins	U.S.A. Dep. Agr.*
U.S.A. Experimental Station Reports	U.S.A. Exp. Stn.†
U.S.A. Horticultural Societies' publications	U.S.A. Hort. Soc.†
U.S.A. State Boards of Agriculture and Horticulture	U.S.A. St. Bd.†
Woburn Experiment Farm Report	Woburn.

* The divisions in which the U.S.A. Government publish Bulletins will be added when necessary.

† The name of the Station or State will in each case be added in full or in its abbreviated form.

NOTES AND ABSTRACTS.

Aloe ciliaris. By F. Morel (*Rev. Hort.*, August 16, 1909, pp. 380–381; coloured plate).—A very beautiful winter-flowering Aloe, bearing trusses of brilliant deep orange red tubular flowers, as in *Kniphofia*, but laxer. A rampant climbing Aloe of much beauty.—*C. T. D.*

Amygdalus nana. By S. Mottet (*Le Jard.* xxiii. 527, p. 69; March 5, 1909; 1 fig.).—A too-neglected type of flowering almond. A distinct species from the South of Russia, whence it was imported in 1783. *A. nana* is only 1 metre high. It has deep pink flowers, and is very useful for cutting. Other species are *alba*, *argentea*, *fruticosa*, *Gesleriana*, *georgica* (one of the most distinct), *microcarpa*, *serrata*, &c. All these are quite hardy and are most useful as foreground shrubs, for rock work, and in forcing for cut flowers.—*F. A. W.*

Anthocyane. By R. Combes (*Ann. Sc. Nat.* vol. ix. Nos. 4–5, pp. 274–303).—Anthocyane, the pigment present in the autumnal tinted leaves of *Ampelopsis hederacea*, *Rosa canina*, *Berberis Aquifolium*, &c., is a glucoside. The red leaves are richer in sugars and glucosides, but poorer in dextrine than the green leaves of the same plant. The pigment is only formed in the presence of oxygen. The rate of respiration of plants is increased by the presence of sugar, hence the accumulation of sugar in the leaves favours the formation of the pigment.—*S. E. W.*

Aphides, Orchard. By C. P. Gillette (*Jour. Econ. Entom.* i. (1908) 5. p. 302; and 6. p. 359).—Technical descriptions of aphides attacking orchard trees are given together with figures. The insects dealt with are the green apple aphis (*Aphis pomi* de Geer=*A. mali* Buckton); the woolly apple aphis (*Schizoneura lanigera* Hausm): the black peach aphis (*Aphis persicae-niger* Smith); the green peach aphis (*Myzus persicae* Sulz.) a great pest with a very wide range of food plants; the black cherry (*Myzus cerasi* Fab.); and *Aphis bakeri* Cowen, which has its winter eggs and spring forms on the apple and pear and later migrates to the clover.
F. J. C.

Apple Blotch. By W. M. Scott and J. B. Rorer (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 144; March 1909; 6 plates).—A widely distributed disease of apple, called blotch, does great damage in the Southern States, often rendering 50 per cent. of the fruit unfit for marketing. It is due to the fungus *Phyllosticta solitaria.* The fruits, leaves and twigs are all attacked, and the attack upon the twigs, which are caused to become cankered, plays an important part in the life cycle of the fungus. The blotch on the fruit is very small, inconspicuous and light brown at first, but it spreads rapidly, increases in size up to ⅜ in. in diameter, and becomes darker in colour. The margin of the blotch is irregular and jagged and has a fringed appearance. When young apples are attacked, since only the outer cells are killed, the fruit may crack owing to the continued growth of the uninjured tissues. The appearance of the blotches varies somewhat on different varieties of apple. The black fruits (pycnidia) of the fungus appear on the spots after a few days. The spots on the leaves are very small and of minor importance. The fungus passes the winter on the twigs, on which it forms small canker spots (which are fully described in the paper), occasionally killing the twigs. From the twig cankers the disease spreads by means of spores to the other parts of the tree, and these form the chief source of infection. Like most diseases, this is more or less dependent upon weather conditions, damp weather favouring the spread of the disease very greatly. Different varieties show very variable degrees of susceptibility to the attacks of the fungus. A description of the fungus and its cultural characters is given, and an account of spraying experiments with Bordeaux mixture, the application of which at intervals of about three weeks, commencing when the cluster buds are well out and continuing until the end of July or even later, gave satisfactory results.—*F. J. C.*

Apple, Croatian. By V. Nemcanis (*Le Jard.* xxiii. 528, p. 55; February 20, 1909; 1 fig.).—This apple is known in Croatia as *Sistschika* (Heart Apple). Stem smooth and rather greasy. The fruit is very large and rounded and somewhat flattened; olive-green flushed with carmine. Flesh is greenish-white, tender, juicy, slightly acid. Useful November to June, of vigorous growth and hardy, a fine orchard tree. The fruit keeps well, and is equally good for dessert and for cooking.—*F. A. W.*

Apples, Dimples in. By E. P. Taylor (*Jour. Econ. Entom.* i. (1908) p. 370; figs.).—The author has found that the tarnished plant bug (*Lygus pratensis* L.) lay their eggs, which are of an oval, elongate, bottle-shaped form, in the small slits in the apple skin while the fruits are very small. The eggs are placed singly in the incisions. A few of the apples attacked dropped early, the others developed pits in their contour as they grew larger. The dimples appear not to impair the keeping qualities of the apple.—*F. J. C.*

Apple-leaf Hopper. By F. L. Washburn (*Jour. Econ. Entom.* ii. (1909) 1. p. 54; 1 plate).—The eggs of this insect (*Empoasca mali* Le B.) are laid in small blisters on the apple and perhaps on the elm. They are hyaline and semi-opaque, about as long as, but much narrower than, the blisters in which they lie. They are laid about the end of September and the insect winters in this stage. Other broods are produced in the summer and the eggs are laid on a variety of herbaceous plants. The plants on which the insects have been found are apple, clover, plum, maple, bur-oak, black oak, thorn apple, basswood, hazel, box elder, chokeberry, sumac, birch, *Syringa*, *Carragana*, raspberry, blackberry, beans, corn, lucerne, sugar beet, buckwheat, dahlia, hemp, rhubarb, potatos and grasses. The most serious damage is done to nursery stock, the curling of the leaves of the young trees causing a check in their development. Catching the insects on a tarred board as with turnip flea beetles is recommended. Professor J. B. Smith states that these insects are readily attracted by light.—*F. J. C.*

Apple Orchards: Does it pay to spray? By R. A. Emerson and F. E. Denny (*U.S.A. Agr. Exp. Sta., Nebraska, Bull.* 106, May 1908).—A series of experiments was made in the Nebraska apple orchards with spraying. These proved that on the average a considerable gain accrued, after cost of spraying was deducted, not only in quality but also in quantity of first-size fruits. Full descriptions of the methods adopted are given.—*E. F. H.*

Apple Sawflies. By R. L. Webster (*Jour. Econ. Entom.* vol. i. 5, p. 310; October 1908).—Certain sawfly larvæ feed in apples although usually feeding on other plants. *Taxonus nigrisoma* is reported as burrowing in apple flesh, the burrow being about half the depth from the skin to the core. This larva usually feeds on dock and *Polygonum*.

F. J. C.

Apple-tree Tent Caterpillar. By A. L. Quaintance (*U.S.A. Dep. Agr., Bur. Entom., Circ.* 98; January 1908; 4 figs.).—The caterpillars of this insect (*Malacosoma americana*) make tents similar to those of the lackeymoth. They feed on the foliage and often cause complete defoliation. The eggs are laid in belts encircling the branches in early midsummer, and are hatched out in the spring. The larvæ spin cocoons in sheltered places, as under loose bark, and the perfect insect emerges about three weeks after pupation begins. A considerable number of insects are known as parasites of this troublesome pest, and a few birds feed upon them. It is recommended that useless trees be removed, that the eggs be collected during the winter when the operation of pruning is performed, or the nests may be completely removed or burnt with a torch when the larvæ are at home.—*F. J. C.*

Apple trees injured by Tree Crickets. By P. J. Parrott (*Jour. Econ. Entom.* ii. (1909), 2, p. 124).—Spots on apple bark of a rather dark reddish brown colour with a purplish tinge, more or less circular in outline, somewhat resembling canker spots, are described as being caused by punctures of egg-laying tree crickets (*Oecanthus niveus* de Geer), the eggs being deposited in the punctures. Trees in neglected situations are the most commonly attacked. A comparison between the eggs of *Oe. niveus* and *Oe. nigricornis* is made.—*F. J. C.*

Apple Trees: Spraying and Orchard Pests in Kentucky. By H. Garman (*U.S.A. Agr. Exp. Sta., Kentucky, Bull.* 133, January 1908; 27 plates).—The numerous insect and fungoid pests prevalent in the Kentucky orchards are well illustrated and described. A series of ten experiments was carried out in spraying to ascertain whether treatment with various insecticides before or after blooming is the best. The results are set forth, but do not show any conclusive differences.—*E. F. H.*

Apple Trees, Tumours on. By J. Jaeger (*Zeit. f. Pflanzkr.* vol. xviii. No. 5, 1908, p. 257; 1 text fig.)—Tumours or excrescences on the branches of young apple trees are described which cause serious damage. The outgrowths are produced by a proliferation chiefly of the tissues of the medullary rays. Whether the cause lies in abnormal conditions of nutrition or perhaps in animal pests (Tetranychus) is not yet clear.

G. H. P.

Araliaceae. By R. Viguier (*Ann. Sc. Nat.* vol. ix. No. 6, pp. 305-405; 13 figs.).—A description of the classification, geographical distribution, and morphology of *Aralia*, *Acanthopanax*, *Schefflera*, and *Dizygotheca*.—*S. E. W.*

Arctostaphylos nevadensis (*Die Gart.*, p. 326; July 10, 1909).—A very hardy evergreen shrub of creeping habit with small ovate leaves, urceolate pink flowers, and orange berries. It resembles *Arctostaphylos Uva-Ursi*, a British plant, but is easily distinguished by the reddish bark, light green leaves, pink flowers, and bright coloured fruit.—*G. R.*

Arsenical Sprays, Danger of, to Fruit Trees. By E. D. Ball. (*Jour. Econ. Entom.* ii. (1909), p. 142).—The author criticises the statements made in a recently published bulletin of the Colorado Experiment Station (No. 118), in which the death of large numbers of apple trees had been attributed to the use of arsenical sprays. He considers the evidence not convincing, and attributes the death of the trees to other and well-known diseases, which occur in places where arsenical sprays are never used. He corroborates the bulletin so far as to warn fruit-growers against using even slightly alkaline water or water containing common salt in solution in diluting arsenical washes, and suggests that heavy spraying on *alkaline* soils may constitute an important source of danger.—*F. J. C.*

Artemisia lactiflora (*Die Gart.*, p. 230; May 15, 1909).—A fine hardy perennial and perhaps the best of the genus. It grows from 5 to 6 feet in height, and has pinnate leaves and long panicles of small creamy white flowers which have a faint fragrance. The time of flowering is during August and September till the end of October. A very ornamental plant for beds and borders as well as the wild garden, and very useful as a cut flower.—*G. R.*

Asparagus Beetles. By F. H. Chittenden (*U.S.A. Dep. Agr., Bur. of Entom. Circ.* 102; May 1908; figs.).—Life histories of these well-known European beetles (*Crioceris asparagi* and *C. duodecimpunctata*) are detailed, the larvæ of one living on the shoots, of the other, at least for a time, in the berries. Spraying with a wash of 1 lb. arsenate of lead, 2½ lb. resin soap, and twenty-four gallons water gave excellent results. The larvæ of the former may be beaten off on a hot day and will perish before they reach the plants again.—*F. J. C.*

Aspidiotus destructor (Sig.) **and its Chalcid Parasite in Tahiti.** By R. W. Doane (*Jour. Econ. Entom.* i. (1908) 6. p. 341).—This scale insect is extremely injurious to cocoanuts and other palms in many parts of the tropics. The trees are often so badly infested that they are rendered unfruitful; all parts of the tree except the roots are attacked. Recently, however, many of the trees in Tahiti have shown signs of recovery and the author has ascertained that this is due to the destruction of the scale insects by the chalcid parasite *Aspidiotiphagus citrinus* Craw. On some trees from 50 per cent. to 70 per cent. of the scale insects were found to be parasitized. The parasite was also found on some of the neighbouring islands.—*F. J. C.*

Basket Willows, Production and Consumption of, in the United States for 1906 and 1907. By C. D. Ekell (*U.S.A. Dept. Agr., Forest Service, Circ.* 155; January 1909).—To those who are interested in the culture of willows for basket-making this pamphlet will be instructive. As with us the varieties of willows grown are numerous, many being of local growth and named accordingly. The annual consumption of home-grown peeled basket willows in the United States at present approximates 855 tons, the cost of unpeeled wands being from £12 to £20 the ton—the peeled of course commanding a much higher price. The old English industries of willow-growing and basket-making are almost things of the past, cheap foreign productions and preferential carriage rates having well-nigh ousted this woodland occupation of our forefathers. It will be interesting to note how the industry succeeds in America.—*A. D. W.*

Begonia, Abnormal Flowers of. By Prof. F. Hildebrand (*Beih. Bot. Centralbl.* vol. xxv. Abth. 1, Heft 1, pp. 81–114, August 1909; 2 figs. and 3 plates).—Describes very fully some peculiar sports and abnormalities in certain flowers of *Begonia.*—*G. F. S.-E.*

Bordeaux Mixture, Effect on Potato-leaf Assimilation. By O. Kirchner (*Zeit. f. Pflanzkr.* vol. xviii. No. 2, 1908, p. 65).—Apart from its action in warding off *Phytophthora*, Bordeaux mixture has been credited with the power of increasing the assimilatory power of the potato foliage and thus increasing the yield. Some have explained this by assuming that the copper salt exercises a tonic or stimulating effect on starch formation. Others have explained it as being the result of the shading of the leaf caused by the film of sprayed material on it which they consider acts beneficially, although still other observers consider that this shading action is the reverse of beneficial.

Kirchner's object is to ascertain whether it really is a fact that spraying potatos with Bordeaux mixture does—*in the absence of potato blight*—really cause an increased yield. He first reviews critically the field results of previous investigators, placing them in three groups. (1) Six cases where sprayed potatos (in the absence of *Phytophthora*) gave a smaller yield than the unsprayed. (2) Four cases where the sprayed plants produced wholly or partly a greater yield than the unsprayed, the increase being explained as due not to increased energy of leaf assimilation but purely to the increased duration of life of the sprayed foliage. (3) Five cases in which the sprayed plants gave a greater yield than the unsprayed without any explanation being given as to the reason why. He then gives a detailed account of his own experiments. In 1904 there was practically no difference in yield between sprayed and unsprayed. In 1905 there was a difference in favour of the sprayed which is partly explained by the increased length of life of the foliage. In 1906 no results could be obtained as *Phytophthora* was very abundant. In 1907 there was a very decided decrease in yield in the sprayed plants, which could not be entirely put down to shading and which suggests the idea of a direct poisonous action on the plant of the Bordeaux mixture.

G. H. P.

Bordeaux Mixture, Points in the Preparation of. By W. Kelhofer (*Internat. phytopath. Dienst.* vol. i. No. 3, 1908, p. 65).—The character and action of Bordeaux mixture depend on the quality of the materials, the quantities of each used, and the method of preparation.

The greater the amount of lime used, the sooner the precipitate loses its flocculent nature and the more easily it is washed off the foliage, but if only the amount of lime theoretically required is used there is a danger of the copper soon becoming soluble and washing off. Hence to prevent mechanical washing off and to retard the solution of the film of copper salt, it is best not to use the mixture in a neutral condition, but to use excess of lime, the amount depending on the kind, intensity, and frequency of the prevalent rains in a given district. The solution should be mixed cold, and the copper sulphate and the lime should each be diluted as far as possible before mixing, i.e. the copper sulphate should be dissolved in half the total quantity of water that is to be used and the lime mixed with the other half. The copper sulphate solution should be poured into the milk of lime *slowly*, and not *vice versâ*. The mixture is almost as good if the milk of lime is poured *quickly* into the copper sulphate solution, but it is difficult to do this, and the former method works best in practice. Certain additions are advantageous—in particular, sugar. In France, sugar in large quantity was formerly much used, but Kelhofer finds that a very small quantity is all that is necessary, the actual amount depending on the quantity of lime used. In practice with the usual 2 per cent. formula, 50 grams of sugar to each 2 hectolitres is suitable. The sugar acts as a *preservative* (it must be added at the time of mixing, or at least within twenty-four hours of this), and when it is used, the whole amount of mixture required for one season may be prepared at one time and used when required.—*G. H. P.*

Bracken as Litter. By E. J. Russell, D.Sc. (*Gard. Mag.* 2881, Vol. lii. p. 44, and 2882, p. 71; January 16, and 23, 1909).—The value of bracken for litter as compared to straw, its composition before use and after as manure is carefully explained, and the results of analysis and actual trial given. The author states that bracken contains three times as much nitrogen, and as much phosphoric acid as straw, but less potash. Its manurial value is about 50 per cent. higher than that of straw. It possesses greater absorbing power than straw, but is much inferior to peat moss. As a manure its decomposition is slow, which renders it more effective on heavy clay soil.—*E. B.*

Cabbage Bug, The Harlequin. By F. H. Chittenden (*U.S.A. Dep. Agr., Bur. of Entom., Circ.* 103; June 1908; figs.).—This insect (*Murgantia histrionica* Hahn.) causes the leaves of cabbage and other crucifers to wilt by piercing the veins and sucking the sap. The adult insect is red and black and quite conspicuous. It is native in Mexico and Central America, and is spreading northward, where it is likely to do great damage until adverse climatic conditions check its progress. It is recommended to plant early crops of rape, radish, or mustard that would attract the insects, and then to destroy these by means of hand torches, etc.

F. J. C.

Carnations, Effect of Gas upon. By W. Crocker and Lee J. Knight (*Bot. Gaz.* vol. xlvi. pp. 259-276, October 1908; 4 figs.). A series of experiments has been made illustrating the fatal effect of coal-gas upon carnations. Young buds of 'Boston Market' and 'Pink Lawson' may be killed by three days' exposure to an atmosphere containing only one part of coal-gas to 40,000 of pure air. Open flowers of these varieties close after twelve hours' exposure to one part in 80,000.

Ethylene is still more dangerous, for one part in a million prevents the opening of buds (three days' exposure), and one part in 2,000,000 causes the closing of flowers already open. The ethylene in coal-gas may determine the "toxic limit" in the case of these flowers.

G. F. S.-E.

Cascara Sagrada (*Gard. Mag.* No. 2887, Vol. lii. p. 161; February 27, 1909).—This drug, so largely used in medicine, is furnished by the bark of *Rhamnus Purshiana* and *R. californica*, natives of North-west America. Seeds planted at Kew produced trees which withstood severe frosts without protection, while the extract from the bark gave tabloids of the drug which were pronounced equal to those obtained from the usual sources. The possibility of cultivation on the west coasts of the British Isles for commercial purposes is suggested.—*E. B.*

Catalpa Sphinx, The. By L. O. Howard and F. H. Chittenden (*U.S.A. Dep. Agr., Bur. of Entom., Circ.* 96; December 1907; figs.).—Description and life history of a hawk moth (*Ceratomia catalpae* Bdr.), the caterpillar of which lives exclusively on *Catalpa bignonioides* and *C. speciosa.*—*F. J. C.*

Chestnut-Borer, The Two-lined (Agrilus bilineatus). By F. H. Chittenden (*U.S.A. Dept. Agr., Bur. Ent., Circ.* 24, revised; January 1909).—Wherever timber is grown in quantity there will be found injurious forest insects. It is not only the chestnut that has suffered severely in the United States, east of the Rocky Mountains, but various species of oak have also been attacked.

There is a good description of the insect, of the damage done and manner of work, and preventive and remedial measures.—*A. D. W.*

Chicory Parasites: Hadena oleracea. By C. Dublesel (*Le Jard.* xxii. 523, p. 366, December 5, 1908; 1 fig.).—Chicory is extraordinarily subject to caterpillar plagues, and *Hadena oleracea* seems to be on the increase. The caterpillar is green or grey brown, with white dots, while each segment bears warty spots. On the upper surface of the body there are three longitudinal white lines, with a lateral yellow line at the origin of the feet. The chrysalis is rusty brown. The moth, which comes out from May onwards, is reddish-brown above, with lighter colour in the median half. An M-shaped white line extends along the outer border. Spraying with soap water is the usual remedy, but seems to destroy only the smallest caterpillars. Otherwise they may be shaken off, and then crushed on the ground.—*F. A. W.*

Chlorophyll. By J. d'Arbamount (*Ann. Sc. Nat.* vol. ix. Nos. 4-5, pp. 197-229.)—Chlorophyll bodies may be divided into chloroplasts and pseudochloroplasts. The former have a spongy, filamentous or reticulated structure and are not as a rule stained by an acid solution of aniline blue. The pseudochloroplasts are subdivided into four varieties. They exist in the form of spangles or conglomerations of spangles and are stained by aniline blue. It is the pseudochloroplasts which fulfil the important function of reducing the carbonic acid of the atmosphere. Many of our large forest trees contain only pseudochloroplasts.

In certain members of the vegetable kingdom, starch is essential for the formation of both classes of chlorophyll; in other plants starch is not necessary for its production, e.g. in the bud of the sycamore. In some buds the appearance of starch granules precedes the formation of chlorophyll, in others the case is reversed.—*S. E. W.*

Chrysanthemum Sports, How to induce them. By G. T. Grignan (*Rev. Hort.*, May 1, 1909, p. 196).—It is suggested that variation is induced by excessive propagation; cuttings are taken repeatedly as soon as they are long enough, and it is the later cuttings which are assumed to be less robust and to lose to some extent their equilibrium, the result being, especially if the major part of the plant be removed, a greater tendency to produce sports. Under such conditions the writer cites the production of 'Madame Constant Walker,' while 'Mrs. Henry Robinson' gives each year yellow sports. 'Souvenir de Madame Manière' also produced a yellow sport the first year it was put on the market. Cultivators on a large scale have thus a greater chance proportionally than small ones.—*C. T. D.*

Ciders and Perries, The Rate of Fermentation of. By B. T. P. Barker, M.A. (*Jour. Agr. Sci.* iii. (1908) 1, p. 1).—The author finds that the rate of fermentation of different ciders and perries varies markedly, and considers it probable that some varieties of fruit yield juices which ferment more rapidly than others. The main factor in determining the rate of fermentation appears to be the nitrogenous matter present in the juice, which is assimilable by the yeast, and the quantity present is usually below the optimum quantity for rapid fermentation. If other substances influence the rate of fermentation their influence is masked by this more important substance. The state of ripeness at the time of milling affects the rate of fermentation, the latter being at its slowest when the period of perfect ripeness is reached, and increasing as ripeness proceeds to decay. The rate of fermentation is also decreased when the fruit has been exposed to bright sunshine.

In practical cider-making the rate of fermentation does not appear to be influenced by the high or low fermentative powers of the yeasts present, the varieties normally present being capable of maintaining the fermentation at the maximum rate allowed by the nitrogenous constitution of the juice.

The admission of air to the juice has a marked effect in increasing the rate of fermentation, which is also influenced in the usual way by changes in temperature.

The author points out that it should be possible to exercise some amount of control over the rate of fermentation by judiciously blending the various types of fruits after proper selection, so that the production of sweet and dry types of ciders and perries may be a matter of less dependence upon chance than at present.—*F. J. C.*

Cistus. By J. Pagnet (*Le Jard.* xxiii. 526, p. 20; January 20, 1909; 1 fig.).—The southern species of Cistus are more hardy than is supposed, as they will usually stand 12–13 degrees of frost. Such are *Cistus albidus* L., *C. monspeliensis* L., *C. salvifolius* L., *C. ladaniferus* L., *C. laurifolius* L., *C. creticus* L., *C. populifolius* L. All these can be grown from seed or cuttings, and are easily protected in winter by removing to a cool house. They are charming plants for room decoration, though requiring to be changed frequently.—*F. A. W.*

Clearing Logged-off Land for Farming in the Pacific North-West, The Cost of.—By Harry Thompson (*U.S.A. Dept. Agr., Bur. Pl. Ind., Circ.* 25; April 1909).—The clearing of land for agricultural purposes goes on swiftly in the Pacific North-West, not only the removal of the timber but the clearing of undergrowth and removal of stumps and roots requiring serious attention before grain or other crops can be successfully cultivated. How this is done and the cost of doing it is clearly stated in a series of carefully compiled tables.—*A. D. W.*

Coccideae, The National Collection of. By C. L. Marlatt (*U.S.A. Dep. Agr., Bur. Entom., Tech. Bull.* 16, pt. 1).—Contains a description of the collection of scale insects in the museum of the Department and notes upon the methods adopted for preserving the insects and of describing them.—*F. J. C.*

Codlin Moth, Spraying for. By M. V. Slingerland (*Jour. Econ. Entom.* i. (1908) 6, p. 352).—This article shows that the filling of the calyx cup of the apple with arsenical wash recently advocated (see Jour. R.H.S. xxxiv. (1909) p. 575) is needless. All that is necessary is to use a fine mist-like spray which will leave a small amount of deposit within the cup. In vol. 2. p. 67, Mr. Melander returns to the subject and gives reasons why great force should be used in applying the arsenical washes.

F. J. C.

Copper Carbonates and the Cupri-Carbonates. By Spencer U. Pickering, F.R.S. (*Jour. Chem. Soc.*, vol. xcv.; August 1909; pp. 1409–1429; table).—An investigation into the constitution of the carbonates of copper and allied compounds.

The author prefaces his paper with a useful compilation of the known facts as to the compounds of copper and carbonic acid known or believed to be produced under various conditions. This paper is of especial interest to horticulturists in view of the important part copper salts play as fungicides.

The author found precipitation of copper sulphate in the cold with normal sodium carbonate to produce invariably a basic carbonate $10CuO4CO_2$. This salt is therefore largely the basis of a preparation frequently recommended and used for potato-spraying. The salt decomposes on boiling, evolving CO_2, until finally only traces of carbonate remain.

When sodium bi-carbonate is added to weak solutions of copper sulphate, the basic carbonate $5CuO3CO_2$ is produced, the precipitate being contaminated with sodium carbonate and basic sulphate, especially when excess of copper is present. When concentrated solutions are used CO_2 is evolved, and the precipitate formed redissolves.

Perhaps the most interesting part of the investigation is that of the cupri-carbonates, a name given by the author to the hitherto uninvestigated compounds produced by the solution of certain of the basic carbonates in sodium carbonate.

These were produced by reacting with mixed solutions of carbonate and bi-carbonate of soda upon copper sulphate, and in these the copper becomes electro-negative, taking its place as a constituent of the acid radicle; in this state it does not respond to the usual tests for copper, such as potassium ferrocyanide (prussiate of potash).

The normal carbonate of copper has not yet been isolated.—*W. A. V.*

Crambe cordifolia. By S. Mottet (*Le Jard.* xxiii. 527, p. 37; February 5, 1909; 1 fig.).—The genus *Crambe* is little known as an ornamental plant; *C. maritima* (the seakale) is a favourite vegetable; *C. tatarica* is also edible, but is less inviting; *C. juncea*, and lastly *C. cordifolia*. This handsome plant is native in the Caucasus and Siberia; hence it is perfectly hardy, and might well be planted out in parks and shrubberies. The leaves are shiny and dark green, about 18 inches across. The flowers are white and sweet-scented, very small, but arranged in long heads or sprays like *Spiraea Aruncus*. These plumes are easily blown down and broken, so it is well to tie them to a stake as soon as developed. The plant prefers a sunny aspect, and will flower ten years or more without degenerating. It may be divided in spring.—*F. A. W.*

Crataegus, New Species of. By F. Ramaley (*Bot. Gaz.* vol. xlvi. pp. 381–384; November 1908; 2 figs.).—Two new species are described from Colorado, viz. *C. Doddsii* and *C. coloradoides.*—*G. F. S.-E.*

Cress, Cultivation of. By M. Houssy (*Le Jard.* xxiii. 525, p. 10; January 5, 1909).—Watercress is so easily cultivated, and so lucrative, seeing that it only requires a ditch some 50–60 cm. deep, and 50–60 metres long, that it is a pity more use is not made of it for the English market. Clay soil is the best, as a moderate flow of water from some neighbouring spring will then provide sufficient to moisten the trenches; in light or sandy soil it is necessary to line the ditches, which adds to the cost of production. A cress ditch can be reaped every three months; the plants are best renewed every year. Another method is to saw a barrel in half, and fill the tubs with water, covered with a trellis of wicker or galvanized iron. Plant cress on the top of the meshes. It is not necessary to change the water, as it remains good from May to November. Fertilize with ammonium sulphate every three weeks. This should be pulverized and spread on the water, or dissolved in water and poured in. Again, the tubs may be cut down to 50 cm. from the ground and filled with earth, leaving a drain pipe in the centre, down which water is poured daily. Another plan is to pave a bed of soil with the inverted bottoms of bottles. The depression at the bottom catches and holds water, and if cress is planted between the bottles and watered daily it thrives well.

If attacked by small green caterpillars, a spray of nicotine 1 in 10 will remove them.—*F. A. W.*

Cucumber Beetle, The Striped. By F. H. Chittenden (*U.S.A. Dep. Agr., Div. Entom., Circ.* 31).—A revised edition of the circular dealing with the beetle *Diabrotica vittata*, which does considerable damage to cucumbers and allied plants.—*F. J. C.*

Cucumber Disease, Introduction of a new, into Germany. By Dr. Ewert (*Internat. phytopath. Dienst.* vol. i. No. 1, 1908, p. 8).—Records the first appearance of the "false mildew" *Pseudoperonospora cubensis* (B. et. C.) var. *Tweriensis* in Germany. The fungus, or a variety of it, has long been known in America, and causes great damage there.

G. H. P.

Cunninghamia sinensis. By A. G. Radde (*Die Gart.*, p. 329; July 10, 1909; fig.).—This belongs to the Coniferae, and is not alone rare in European gardens but is nearly exterminated in its native habitat (but see Mr. Wilson's remarks, p. cxxiv). It is quite hardy in a cool position, slightly sheltered from winds. The leaves are evergreen, broad, glaucous green. The specimen described and figured is in the Dendrolog. Gard. at Aix-la-Chapelle, Germany. There is also a fine old specimen in the garden of the Grand Duke of Baden at Baden-Baden.—*G. R.*

Dioon, Anatomy of. By Reinhardt Thiessen (*Bot. Gaz.* vol. xlvi. pp. 357–380; November 1908; plates 23–29).—A very full account of the histology of the seedling of *Dioon edule.*—*G. F. S.-E.*

Eleagnaceae, Monograph of. By C. Servettaz (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 2, Heft 1, pp. 1–128; August 1909; 15 figs.).—The author describes fully, and gives the distribution of all the species in this order which he restricts to the three genera *Hippophae*, *Shepherdia*, and *Eleagnus*. The area of *H. rhamnoides* extends from W. Europe to W. China and from 67° N. lat. to the Mediterranean. It does not occur on the Atlas. It is found from sea level to 2,000 metres alt. in mid Europe and up to 4,000 m. in the Himalayas. It grows best on an argillaceo-siliceous soil which is permeable to water. The place must be sunny and not covered by turf. A particularly favourable situation is the bare slope of a ravine. The author doubts Koppen's view that it existed on the shores of all the tertiary seas, and hence reached the Alps, Caucasus and Himalayas during the period of upheaval of these mountains. The fossils *Folliculite* and *Carpolithes* are supposed by him to be seeds of *Stratiotes*, and other leaves ascribed to *Hippophae* are very like *Pimelea* or *Cornus*. Several new species of *Eleagnus* are described (by the subdivision of *E. latifolia* and from new discoveries). The distribution is interesting, for each group of allied species belongs to a definite geographical area, although the respective areas of two different groups may overlap. The author admits *E. arcticus*, Heer, from the miocene of Greenland as a true *Eleagnus*. The seeds may be distributed by ocean currents. The genus does not occur in New Zealand, Africa, and S. America.—*G. F. S.-E.*

Electric Culture of Early Vegetables (*Le Jard.* xxii. 523, p. 365; December 5, 1908).—At the recent exhibition at Marseilles experiments were carried out with Asparagus and Strawberries on the system of heating with electrical resistances. Instead of heating the hotbeds with hot air or steam, conducting apparatus is plunged at a varying depth beneath the frame, through which are passed currents varying from 1·5 to 5 ampères, the distribution of heat to the surface being more perfect and regular.—*F. A. W.*

Flora of the Italian Lakes. By G. Geilinger (Winterthur) (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 2, Heft 2, pp. 119–420; May 1909; map).—This is a complete flora of the Griqua Mountains (near the Lake of Como). The preliminary chapters are devoted to the geography, geology, meteorology, and bibliography of the district. Then follows the list of species, with habitats, altitudes, and other notes (mosses and ferns included). After the flora follows a description in great detail of the various vegetation types, such as the woodland floras. These types are divided into "formation groups" as deciduous and coniferous woods. Each group is then considered in detail (Oakwood, Chestnut, and Beech formations). Every formation is then divided into special groups, such as in the case of the Oakwood formation—(*a*) Highwood, (*b*) Bushwood, and (*c*) Submediterranean Bushwood. Lists of dominant and other species are given under each of these headings. This treatment involves of course a very thorough description of the usual types of associations. There are sixteen types of grass floras alone without including the mixed and subtypes.

The last chapter is headed "The Regions," an gives the altitudinal limits of the Submontane, Montane, Subalpine, and Alpine regions, as well as of the Mediterranean extensions which occur up to about 400 m. There is a good bibliography and index both to plants and localities on the map.

The book is in fact both an ordinary flora and a full account of the ecology of the district.—*G. F. S.-E.*

Flora of Phrygia. By Jos. Bornmüller (Weimar) (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 2, Heft 3, pp. 440–503; July 1909).—An enumeration of the plants obtained during his third journey to Bithynia and Phrygia. He collected about 1,400 numbers (including fungi, lichens, and mosses). New species are described of *Gypsophila*, *Alsine*, *Astragalus* (four new species), *Onobrychis*, *Scabiosa*, *Carduus*, *Serratula*, *Convolvulus*, *Alkanna*, *Rochelia*, *Verbascum*, and *Marrubium*.—*G. F. S.-E.*

Forcing: Hot-Water v. Etherization. By Professor Hans Molisch, translated by E. Lemoine (*Le Jard.*, vol. xxii. p. 365, No. 523; December 5, 1908).—Eight years ago Professor Johannsen demonstrated that lilacs and other plants in a resting state could be awakened to growth at the beginning of the autumn, if subjected for twenty-four or forty-eight hours to the action of ether, and then forced in the usual way.

This method now seems likely to be supplanted by that of hot-water forcing. In 1906 M. Ferd. Molisch, of Brunn, tried plunging lilacs in November into water at a temperature of 30°–36° C., maintained at constant temperature for ten to fifteen hours, after which they were forced in the usual way. In Russia the same method was applied to lilies of the valley. The crowns to be forced were soaked for twelve or sixteen hours in water at 35° C.; they were then forced at 30°–32·5° C., and flowered several days before the control plants.

Seeing these practical effects Professor Hans Molisch made a scientific study of the method, which is summarized as follows:

1. If shoots or rooted shrubs are plunged into water at 30° or 40° C. during their resting period (only the aërial part of rooted plants being plunged), and soaked for several hours, and subsequently grown on in moderate heat, the resting time will, in many cases, be shortened, and the buds will develop more quickly, The process succeeds well with the following: *Corylus Avellana*, *Syringa vulgaris*, *Forsythia suspensa*, *Cornus alba*, *Ribes Grossularia*, *Larix decidua*, *Rhamnus Frangula*, *Aesculus Hippocastanum*, *Salix*, *Fraxinus excelsior*, &c. Besides the kind of plant and season of the year, success depends on the following factors:—

   a. Length of bath. Six to twelve hours is usually enough. It is well not to exceed twelve hours, because oxidation is very active at this high temperature, and as the O content of water is very limited, the respiration of the plants is hampered, and the buds are damaged or destroyed.

   b. The temperature must vary for different plants, and must be found by experiment. *Corylus*, *Forsythia*, *Ribes*, *Syringa* are started by a bath of 30° C., while *Cornus*, *Rhamnus*, and *Betula alba* require 35° to 40° C.

   c. The action of the bath depends upon the stage of rest that the plants are in. In some it takes effect directly the leaves have fallen, in others much later on. If boughs of ash and horse-chestnut are soaked early in the autumn, they will not force; soaked in December and January, they come on well.

2. The action is purely local. This can be seen by plunging only half the shrub, when the result is unmistakable. A lilac soaked on one side only in November, and then forced, will soon be covered with bloom on the one side, while the other retains its winter appearance.

3. The effect of the hot bath persists even when the plants thus treated are put out in the ground for the rest of the autumn or winter. Directly they are taken up and forced, they react like the plants forced directly after the bath.

4. A prolonged bath of damp air at high temperature has the same effect on many plants as a warm bath at even temperature. In some cases it is even more successful, showing it to be the great heat that in the first instance sets up the changes. Up to the date of this article, however, the moist air bath had only been tried at the end of the autumn, when the resting state is less profound than earlier in the season—so that further experiments must be made. It also remains to discover *how* the heat-

factor acts as an excitant. The internal revolution which abridges or suppresses the resting state may be due to acceleration of respiration by the great heat, but this has yet to be determined.—*F. A. W.*

Forest Insects: Work of the Bureau of Entomology against Forest Insects. By A. D. Hopkins (*Jour. Econ. Entom.* i. (1908) 6, p. 343).—An historical review of the progress of investigation carried on by the Department is given, and a report upon the work accomplished so far.—*F. J. C.*

Forest Planting in Western Kansas. By R. S. Kellogg (*U.S.A. Dept. Agr., Forest Service, Circ.* 161; March 1909).—For the purpose of determining the various kinds of trees that are suitable for planting in Western Kansas a number of experiments have been undertaken, with highly satisfactory results.

The details of planting and the species of trees that were used form one chapter. Those on shelter breaks and such useful trees as the honey locust, white elm, mulberry, cedar, and various species of pines show how closely the question of planting up these heretofore uncultivated lands has been studied. There are a few well executed illustrations accompanying the text.—*A. D. W.*

Forest Survey of Litchfield and New Haven Counties, Connecticut (*U.S.A. Exp. Stn., Connecticut, Bull.* 162; January 1909).—During the Colonial period it would appear that much of the original timber of Connecticut was cut down, and the chief object of this report is to arouse interest in the forest lands and to bring about a well organized system of tree culture. There is much useful information given in this work, as well as several nicely executed illustrations which go far in explaining the text.—*A. D. W.*

Forestry Problems of Vermont, Preliminary Statements regarding the (*U.S.A. Exp. Stn., Vermont, Bull.* 139; March 1909).—The object of this preliminary publication is to explain briefly what forestry is, and to point out the most approved methods of tree-planting, improving woodland, and dealing with the crop. Natural regeneration is also attended to. The instructions given are practical and to the point, while the illustrations of tree nurseries and the tables of forest products and lumber exported from Vermont greatly increase the value of the publication.—*A. D. W.*

Forestry, Quarterly Journal of (April and July, 1909). There is much useful matter in these parts of the "Journal of Forestry," and the editors are to be complimented on their endeavours to resuscitate the original "Journal," whose most useful career so unfortunately terminated in 1886.

Magazines devoted to forestry pure and simple have had rough times at the hands of those whom they were directly intended to instruct and help, and even Mr. Robinson's laudable attempt in "Woods and Forests" did not meet with the support it so well deserved.

Let us hope that the present "Journal of the Royal English Arboricultural Society" will prove a success, and that the usual dwindling support both in contributions and readers, which has been the death of its two predecessors, may not be meted out to this ably conducted book.

There is an excellent practical article on "The Economic Importance of Judicious Tree-Planting for Shelter by Farmers," in which the writer tells us plainly how the best results in that direction are to be brought about. "The Taxation of Woodlands," a letter to the Chancellor of the Exchequer, shows that the cultivation of timber will be seriously handicapped by the Finance Bill.—*A. D. W.*

Frost Damage of the Winter 1908–1909. By M. Läuterer (*Die Gart.* p. 335; July 10, 1909).—The climate of Baden, in the South of Germany, is considered very much less cold than of the North or East of Germany, but many of the trees and shrubs, usually quite hardy, have greatly suffered, and some have been quite killed by the rigour of the exceptionally severe winter. The following is a list of those which have suffered:—*Cryptomeria japonica*, *Ribes sanguinea*, small plants; *Magnolia obovata*, *Ulex europaeus*, *Cercis Siliquastrum*, *Carpinus Betulus* var. *quercifolia*, *Ceanothus americanus*, *Zalkewa Keaki*, *Exochorda grandiflora*, *Chionanthus virginica*, *Halimodendron argenteum*, *Cedrus Deodara*, *C. atlantica*, *C. a. glauca*, *Taxus baccata*, small plants, and *Calycanthus floridus*.—*G. R.*

Fruit Trees, Manures for: Sulphate of Iron (*La Pomologie Française*, p. 360; October–November, 1908).—M. Opoix in 1908 (between July 1 and July 15) directly incorporated sulphate of iron in powder into the interior of the stem of several fruit trees, including pear, apple, peach, and cherry, and declares it has given marvellous results.—*C. H. H.*

Fruits, Chemical Manures in the Intensive Culture of (*La Pomologie Française*, pp. 354–357; October–November, 1908).—The general theory of manures is: (1) that nitrogenous manures cause foliage to be formed in large quantity, they retard the ripening of tissue and lessen their resistance to frost and canker, and spoil the fertility of the trees; (2) that phosphatic manures predispose the plants to fertility and balance vigour with the nitrogenous manures; (3) that potassic manures aid the formation of tissue and framework: (4) that calcareous manures insure the quality and hardness of the wood, its resistance to canker, especially in apples.

Soils rich in lime are stated to give fruit of better colour and quality than soil deficient in lime.

Nitrogenous manures, though little affecting fruits eaten fresh, tend to make fruits required to be kept long more liable to decay.

Phosphatic manures are desirable for young trees and those not fertile, nitrogenous manures for older plants lacking vigour.

Stone fruits specially require lime, more so than pip fruits.

C. H. H.

Fuchsias, Some Novelties in. By G. T. Grignan (*Rev. Hort.*, April 1, 1909, pp. 179–181; coloured plate).—The plate represents three very handsome forms—'Souvenir de Henri Henkel,' scarlet throughout, flowers elongated, as in *Fuchsia fulgens*; 'Robert Blatry,' calyx white with rosy tips, corolla deep rose; and 'Sylvan,' a very handsome, bold flower, calyx rich scarlet, corolla semi-double, white with scarlet stripes, very floriferous. Three others are described as very meritorious, viz. 'Théroigne de Méricourt,' flower double with short sepals, bright red, petals snow white, tinted red at base, forming a compact ball; 'Victorien Sardou,' flowers very double, sepals erect and recurved, brilliant red, petals deep violet red at base; and 'Perfection,' flowers single, sepals recurved, deep red, and petals magenta.—*C. T. D.*

Fumes, Injury to Vegetation and Animal Life by Smelter. By J. K. Haywood (*U.S.A. Dep. Agr.*, *Bur. of Chem.*, *Bull.* 113; May 1908).—The vegetation was injured by a distance of from eight to twenty miles around a smelter owing to the fumes of sulphur dioxide evolved; arsenic was also discharged from the smelter and was found in forage crops in sufficient quantities to poison cattle. Copper contained in the water of a river flowing by the smelter also greatly injured vegetation. Junipers proved more resistant to the fumes than most trees.—*F. J. C.*

Geotropy. By W. Grottian (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 1, Heft 3, pp. 255–285; April 1909). The author found that very low percentages of anæsthetics (·5 per cent. to ·01 per cent. ether) stimulates growth and sensitiveness. Increased sensitiveness to geotropy resulted from rather higher percentages, 3 per cent. amyl alcohol and ethyl alcohol, 15 per cent. ether, and 20 per cent. chloroform. With still higher percentages all sensitiveness ceased although a feeble growth was maintained.

The experiments were conducted on lupine seedlings in an atmosphere saturated with the respective vapours. The author repeated, but could find no confirmation of Czapek's results with antiferment reactions on stimulated and unstimulated roots.—*G. F. S.-E.*

Gerbera Jamesoni Hybrids. By R. Adnet (*Rev. Hort.*, May 16, 1909, pp. 230–233; coloured plate and figs.).—An interesting article on cultivation and new acquisitions. The plate represents several very fine forms, unnamed, bright yellow with pink under side, salmon, red and purple, obtained by hybridization (*G. Jamesoni* × *G. iridifolia*). Require very sunny positions, rich light soil, and good drainage. The hybrids are much hardier than *G. Jamesoni*, and more resistant against wet seasonal conditions, which are fatal to that species.—*C. T. D.*

Germination and Light. By E. Heinricher (*Bot. Zeit.* vol. lxvii. Abth. 1, Heft 4, pp. 45–66).—The author's experiments with seeds of *Phacelia tanacetifolia* show that germination is possible in light, although a much larger percentage of the seeds germinate in darkness. In the dark 46 per cent. germinated, in blue light 39 per cent., in ordinary light 18 per cent., and in red light 8 per cent. By transferring the cultures from light to darkness, or from the red glass to the blue, a further number could be induced to germinate. Seeds germinated in the same year (two months after ripening) in darkness, but not in light. These results point to some photo-chemical effect of certain rays of light.

When the cultures were dried, and then again wetted, a greater number of seeds germinated.—*G. F. S.-E.*

Germination of Orobanchaceae. By S. Kusano (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 1, Heft 3, pp. 286–300; April 1909; 2 plates).—Professor S. Kusano describes (in English) the seedling of *Aeginetia indica* and its method of attacking the host plant. The minute few-celled embryo has at the radicular end about 15 globular epidermal cells. One or more of these cells grow out into hairs which search for the root of a host plant. Many such hairs develop if no contact is at first effected. But on touching such a root, the hairs appear to grow in between its cells; they then contract, curving in like a tendril, and so bring the little embryo into contact with the root. The embryo then grows rapidly, becoming visible to the eye, and forms a primary absorbing tissue or haustorium which penetrates the host plants and develops tracheids in connection with the conducting system of the latter.

The roots of many plants appear to excrete some kind of stimulating substance which is necessary for the germination of the *Aeginetia* seeds, but further development only occurs near the roots of its regular host plants.

Seeds wrapped in filter paper and placed near such roots germinated, but if covered by several layers of paper fewer were able to do so. So it seems probable that a definite stimulating substance is excreted by the roots. The host plants were grown in pots and the seeds placed on the inside of the pots in the meshwork formed by the roots.—*G. F. S.-E.*

Gooseberry Mildew, American, in Germany. By R. Schander (*Internat. phytopath. Dienst.* vol. i. No 4, 1908, p. 97; 3 maps in text).—Deals with the distribution of this pest in Germany up to the year 1907. Spraying with a 1 per cent. solution of potassium sulphide retards the development of the fungus, but it cannot be regarded as a satisfactory method of control. Cutting off the twigs on which the perithecia are found in winter and those affected with mildew in summer is stated to be the best means of prevention. In one or two cases sickness is said to have been caused by the eating of affected berries, both by adults and by children (in one case a child aged 1½ year died), but in a number of other cases no ill effects followed after eating affected berries. About forty cases were noticed in which the red currant was affected by the same fungus, and it also occurred on *Ribes alpinum* and *R. aureum* and was artificially inoculated on *R. atropurpureum.* The author considers it advisable in districts where the disease makes its appearance for the first time and to a slight extent to completely destroy the affected bushes, but in districts where the disease has already got a firm footing this is not to be recommended; here the above-mentioned methods of cutting off and thoroughly destroying the affected twigs should be resorted to. The American Mountain Gooseberry, a derivative of *R. Cynosbati,* appears to be immune, but unfortunately it bears only small fruit. It is suggested that attempts should be made to produce a disease-resistant variety. [Eriksson has found (1909) that in Sweden, at any rate, the American Mountain Gooseberry is not actually immune but only less susceptible to the disease].—*G. H. P.*

Gooseberry Mildew, American. Occurrence in Japan. By E. S. Salmon (*Internat. phytopath. Dienst.* vol. i. No. 2, 1908, p. 59).—The fungus causing this disease, or at any rate a variety of it, was observed on *Stephanandra flexuosa* from Japan. It is morphologically almost identical with that attacking species of *Ribes* in these islands, although the perithecia and asci of the Japanese form are slightly smaller than those of the American species. It is not yet known whether it occurs in Japan on any species of *Ribes*. It has been recorded as *Sphaerotheca mors-uvae* var. *japonica*.—*G. H. P.*

Grape-vine Root-borer, The. By F. E. Brooks (*U.S.A. Exp. Stn., Virginia, Bull.* 110; November 1907; figs.).—The larvæ of the moth *Memythrus polistiformis* feed in the roots of vines in many parts of the States, at times doing considerable damage. A description of the moth and its larva is given, and full notes upon its life history. The pest is difficult to combat, since the larva feeds in the root, a foot or more from the stem of the plant. Digging out the larvae is almost impracticable; profitable immune varieties are not known; the moths may be killed in August, and it is considered that thorough cultivation will greatly reduce the ravages of the pest.—*F. J. C.*

Grass of the Alpine region in Colorado. By T. Holm (*Bot. Gaz.* vol. xlvi. pp. 422–454; December 1908; 5 figs. and 1 plate).—The author has examined the distribution of the specially alpine grasses both in the Colorado Rockies and throughout the North Temperate Hemisphere. Of special interest to British readers are his tables illustrating the range of *Phleum alpinum*, *Aira caespitosa*, *Poa alpina* and *Festuca ovina*. These Alpine species are more cosmopolitan than those found at lower altitudes, and some arctic and circumpolar species are characteristic of alpine floras. He found also that the habit as well as the floral and anatomical characters of the alpine species are very uniform and simple.
G. F. S.-E.

Greenhouse Crops, Soil Treatment for. By H. J. Wheeler and G. E. Adams (*U.S.A. Exp. Stn., R.I., Bull.* 128; June 1908).—Experiments were carried out to ascertain whether manuring with farmyard manure or with chemical fertilizers gave the best results in the cultivation of certain plants under glass. Radishes and lettuces, especially the former, were found to mature earlier and to yield heavier, but different varieties of carnations varied greatly.—*F. J. C.*

Harlequin Plant Bug. By R. I. Smith (*Jour. Econ. Entom.* ii. (1909) 2, p. 108).—Certain points in the life history of this insect (*Murgantia histrionica*, Hahn), such as egg-laying habits and so on, are dealt with. From a consideration of its life history it is recommended that this insect should be vigorously fought in the autumn, especially as the hibernated insects are much more prolific than the summer generations.—*F. J. C.*

Hydrangea, A Climbing. By F. Morel (*Rev. Hort.*, August 1, 1909, pp. 350–351; 3 figs).—Two of these illustrations depict *H. petiolaris* which appears to be confused with *Schizophragma hydrangeoides*, which is figured to show difference. The third illustration reproduces a photograph of part of a plant covering a wall 20 metres long and bearing a profusion of fine flowers. Vigorous and hardy in France.—*C. T. D.*

Importation of Tetrastichus xanthomelaenae (Rond.). By L. O. Howard (*Jour. Econ. Entom.* i. (1908) 5, p. 281).—The European elm-leaf beetle (*Galerucella luteola*) was imported into America in 1837 and has recently spread to a great extent. It has no natural enemies in America, but in Europe there are two or three egg-parasites of this beetle and its near relatives. Among them *Tetrastichus xanthomelaenae* was found by Marchal to have stopped the ravages of the beetle on the elms round Paris, where it had been very destructive, skeletonizing the leaves. Dr. Marchal's description and interesting notes are translated and added to this article. Eggs parasitized by the insect were obtained and conveyed to America in 1907, but the parasites were dead on arrival. Others were obtained in April 1908, and these were successfully reared, and after multiplying were liberated where the bettles and their eggs were abundant. They began to breed and are apparently multiplying rapidly, and the writer considers there is every hope of keeping the beetles in check by means of this parasite.—*F. J. C.*

Inoculation and Lime in Growing Alfalfa. By H. A. Harding and J. K. Wilson (*U.S.A. Exp. Stn., New York, Bull.* 313; February 1909; figs. and maps).—The authors show that on American soils the application of lime and inoculation with the appropriate nodule-producing bacteria is followed by a greatly increased growth of lucerne (or alfalfa). The inoculation was performed for the most part by means of soil from fields where the bacteria were abundant.—*F. J. C.*

Insecticide, Use of Cyanide as an. By R. S. Woglum and Wm. Wood (*Jour. Econ. Entom.* i. (1908) 6, p. 349).—Pouring a solution of one ounce of potassium cyanide in one gallon of water into nests of ants was found successful in destroying them. The solution would probably be much safer to use for such purposes than the solid substance, as there would be no chance of animals picking it up from the ground.

F. J. C.

Insects Injurious to Loco Weeds. By F. H. Chittenden (*U.S.A. Dep. Agr., Bur. Entom., Bull.* 64, pt. 5; figs.).—The insects living on *Astragalus mollissimus* and *A. Lambertii* are described. The poisoning of sheep feeding on these plants on the semi-arid plains of the West of America has been attributed to the insects living upon the plants; but it cannot be due to them.—*F. J. C.*

Insects that Carry Disease. By L. O. Howard (*U.S.A. Dep. Agr., Bur. Entom., Bull.* 78; May 1909).—This masterly account deals with the important question of the enormous economic loss arising from the unchecked development of mosquitos and house-flies. It shows that in seven years 1900–07 an average of over 12,000 people died annually through malaria in the States, and the germs of this disease are carried from one to another solely by mosquitos of the genus *Anopheles*. Yellow fever in like manner is carried by the mosquito *Stegomyia calopus* (=*Culex fasciatus*), and this disease again claims many victims in the United States. The house-fly Howard proposes to call the "typhoid fly" in order to draw popular attention to the fact that this fly is a very frequent cause of the spread of typhoid fever and other diseases. The best means of dealing with the pests is also treated upon.—*F. J. C.*

Lagerstroemia indica (*Die Gart.*, p. 152; March 27, 1909).—This beautiful shrub, which is invariably hardy in England and flowers annually, is treated in the more rigorous climate of Germany as a cool greenhouse plant, grown in pots or tubs during the summer out of doors, in winter indoors. It flowers during the late summer. The flowers are rosy red and the leaves are small, not unlike those of the large-leaved myrtle.
G. R.

Lantanas, Choice. By G. T. Grignan (*Rev. Hort.*, May 1, 1909, pp. 204–226; plate and 2 figs).—An interesting article, with descriptive list of twelve of the best novelties. The plate represents a dwarf section, 'Bruant;' 'Rayon d'Or,' brilliant yellow; 'Radiation,' deep copper orange; and 'Pictavi,' a hybrid between *Lantana Sellowiana* and the varieties of commerce, which has proved hardy and is very distinct; flowers, a few bright yellow, the majority bright magenta.—*C. T. D.*

Light sensitiveness. By W. W. Lepeschkin (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 1, Heft 3, pp. 308–356; April 1909). The movements of the pulvinus of *Mimosa* and of the leaflet stalks of *Phaseolus vulgaris* and *Desmodium gyrans* have been again investigated. The author's experiments were very ingenious, and should be consulted by those interested in this special subject. His chief point seems to be that darkness affects the permeability of the protoplasmic membrane, which will bring about an alteration in the turgor, and therefore in the shape of the pulvinus or petiolule.—*G. F. S.-E.*

Maple Mites. By P. J. Parrot (*Jour. Econ. Entom.* vol. i. 5, p. 311; October 1908).—Fifteen species of mites have been found on various species of *Acer* in the States. Descriptions of two which form galls on maple are given, viz. *Phyllocoptes aceris-crumena* Riley and *P. quadripes* Shimer.—*F. J. C.*

Marsh Plants. By Paul Bommersheim (*Beih. Bot. Centralbl.* vol. xxiv. Abth. 2, Heft 3, pp. 504–511; July 1909).—This paper contains some interesting observations on reed thickets and "half-marsh" plants. The author collected leaves of the common nettle from a moderately wet situation, from a reed-bed, and from a dry place, and measured the upper surface of ten leaves from each habitat. In plants from the reeds this amounted to 15 square centimetres, from the dry habitat 28 square centimetres, and from an ordinary position 37·5 square centimetres. Those from the reeds transpired least. In reed-beds the air being generally damp there is a distinct probability of fungus infection, and he details the methods of averting this danger. He found that certain leaves of *Phragmites* which happened to be in contact with a brick wall were wet with dew in the morning, and were subsequently attacked by fungus parasites. The ordinary leaves, which were always in motion, remained dry and were unaffected.—*G. F. S.-E.*

Mendelism as applied to Sweet Peas. By William Cuthbertson (*Gard. Mag.* No. 2885, and No. 2886, vol. lii. pp. 131 and 148; February 13 and 20, 1909).—The author briefly sketches Mendel's laws and shows how they apply to the raising of new varieties of Sweet Peas. He points out how time may be saved in fixing new varieties.—*E. B.*

Metals, Fertilizing Action of. By H. Martinet (*Le Jard.* xxiii. 528, p. 51; February 20, 1909).—In Belgium experiments are being made by Mons. Henri Michiels and P. du Heen which go to show that metals may act on plants as ferments, stimulating nutrition and germination. Manganese is already adopted as a fertilizer, and now the same properties are claimed for zinc, aluminium, tin, and magnesium.

F. A. W.

Microcachrys (*Bot. Gaz.* vol. xlvi. p. 466; December 1908).—Mr. Boyd Thomson describes the curious winged pollen-grains and remarkable prothallial tissue of this conifer.—*G. F. S.-E.*

Movements of lower Organisms at low Temperatures. By E. C. Teodoresco (*Ann. Sc. Nat.* vol. ix. Nos. 4–5, pp. 231–274; 4 figs.)—At a temperature of 0° C. the protoplasm in the cells of the higher members of the vegetable kingdom, e.g. *Elodea*, *Tradescantia*, *Tolypellopsis*, ceases to move. On the other hand, lower organisms, such as diatoms, infusoria, rotifers, continue to move when exposed to a temperature of 5° to 12° below zero.

The zoospores of *Dunaliella* may even be cooled down to a temperature between 17° and 22·5° below zero before they cease to move.

S. E. W.

Mushroom, A poisonous. By G. F. Atkinson (*Bot. Gaz.* vol. xliv. pp. 461–463; December 1908; two figs.).—Description and illustrations of *Tricholoma venenatum.* This fungus produced violent and hemorrhagic vomiting, diarrhœa, sweating, and some cardiac disturbance lasting several hours at Rochester, Mich.—*G. F. S.-E.*

Naegelia, New Hybrid of. By Eugene Vallerand (*Rev. Hort.*, June 1, 1909, pp. 255–257; coloured plate and 1 illustration).—The plate represents a plant and a number of very diverse flowers, all very handsome. They form erect-growing somewhat lax trusses of Pentstemon-like flowers, surmounting handsome bold and somewhat pendulous cordate serrate leaves. The flowers shown are pure scarlet, yellowish-white throats, corolla white ground suffused and dotted with deep red; deep salmon with white patches dotted with same colour; crimson with deep yellow throat dotted with crimson and bright yellow, minutely dotted with pink. Recommended as worthy companions of 'Gloire de Lorraine' Begonia, *Primula obconica*, &c. Winter-flowering. Specially recommended novelties are 'Baiser de Flore,' 'Etoile de Mer' 'Explorateur Charcot,' 'Fée Orientale,' 'Imbroglio,' 'Marguerite Terminet,' 'M. d'Argenée' and 'Soleil de Minuit.'—*C. T. D.*

Nicotiana, Hybrid. By N. Vallet (*Le Jard.* xxii. 524, p. 379; December 20, 1908).—Attempts are being made to produce hybrid Nicotianas that shall bloom freely throughout the summer, and be resistant to sunshine. The most successful results hitherto obtained have been by grafting hybrids of *N. Sanderae* and *N. affinis* on to *N. colossea*, and these grafted hybrids have been induced to flower at a height of six feet, the lower part of the plant being the natural growth of *N. colossea.*
F. A. W.

Orchards, Starting Young. By W. H. Munson, W. E. Rumsey, and F. E. Brooks (*U.S.A. Agr. Exp. Sta., West Virginia, Bull.* 116; April 1908).—This valuable contribution to fruit culture covers the whole area of work dependent on the formation of a young orchard, and deals with the general cultivation, mulching, cropping, pruning, and the control of insect and fungoid pests after the actual planting has taken place.
E. F. H.

Orchid Portraits.—The following orchids have been figured recently:—

Angraecum sesquipedale	*Gard. Chron.* 1909, i. p. 399, fig. 177.
Brassocattleya × Sandhaghensis	*Orch. Rev.* 1909, p. 241, fig. 19.
B.-c. × Susannae.	*Flor. Exchange*, 1909, p. 529; *Orch. Rev.* 1909, p. 137, fig. 11.
Bulbophyllum Dearei	*Journ. Hort.* 1909, ii. p. 147.
Cattleya Mossiae var. Mariana	*Amer. Gard.* 1909, p. 1216.
*C. Mossiae var. 'Gatton Park'	
Coelogyne asperata	*Gard. Chron.* 1909, ii. p. 34, fig. 15.
C. cristata	*Gard. Chron.* 1909, ii. p. 75, fig. 31.
Cynoches peruvianum	*Gard. Chron.* 1909, i. p. 309, fig. 133.
Cymbidium insigne Sanderi	*Journ. Hort.* 1909, i. p. 415.
Cypripedium × Chapmanii	*Journ. Hort.* 1909, ii. p. 75.
C. insigne var. 'Grand Monarch'	*Gard. Mag.* 1909, p. 375.
C. insigne var. 'Gwynedd'	*Gard. Mag.* 1909, p. 375.
C. spectabile	*Gard. Mag.* 1909, p. 494.
C. × 'Venus'	*Orch. Rev.* 1909, p. 145, fig. 12.
*Dendrobium acuminatum	*Gard. Chron.* 1909, ii. p. 150, fig. 64; *Gard. Mag.* 1909, p. 659.
D. Bronckartii	*Bot. Mag.* t. 8252.
D. × chessingtonense	*Gard. Mag.* 1909, p. 394.
D. nobile virginale	*Gard. Mag.* 1909, p. 394; *Orch. Rev.* 1909, p. 200, fig. 15.
*D. Sanderae	*Gard. Chron.* 1909, i. p. 374, fig. 163; *Gard. Mag.* 1909, p. 621; *Orch. Rev.* 1909, p. 209, fig. 17.

D. thyrsiflorum	*Journ. Hort.* 1909, ii. p. 3.
D. Wardianum	*Garden*, 1909, i. p. 199.
Disa crassicornis	*Garden*, 1909, i. p. 187.
Eulophiella Elizabethae	*Gard. Chron.* 1909, i. p. 407, fig. 178.
*Laeliocattleya × 'Black Prince'	
L.-c. × 'Berthe Fournier,' Westonbirt var.	*Journ. Hort.* 1909, ii. p. 99.
*L.-c. × Choletiana	
*L.-c. × 'Eurylochus'	
*L.-c. × 'Feronia'	
*L.-c. × 'Golden Oriole'	
*L.-c. × 'Invincible'	
*L.-c. × 'Jason'	
*L.-c. × 'Mikado'	*Journ. Hort.* 1909, i. p. 555; *Garden*, 1909, ii. p. 313.
L.-c. × Statteriana	*Journ. Hort.* 1909, ii. p. 123.
Maxillaria Sanderiana	*Gard. Mag.* 1909, p. 414.
Megaclinium purpureorachis	*Gard. Chron.* 1909, i. p. 293, fig. 126.
Miltonia Weltoni superba	*Rev. Hort. Belge*, 1909, p. 125.
Miltonioda × Harwoodii	*Journ. Hort.* 1909, ii. p. 51; *Orch. Rev.* 1909, p. 233, fig. 18.
Odontioda × chelsiensis	*Gard. Chron.* 1909, i. p. 348, fig. 153.
O. × Elwoodii	*Orch. Rev.* 1909, p. 169, fig. 13.
O. × 'Ernest Henry'	*Gard. Chron.* 1909, i. p. 321, fig. 138; *Journ. Hort.* 1909, i. 483.
*Odontoglossum × 'Aglaon'	
*O. × amabile Fowlerianum	
*O. × ardentissimum 'Starlight'	
O. crispum 'Minoru'	*Gard. Mag.* 1909, p. 423.
O. crispum 'Solum'	*Orch. Rev.* 1909, p. 185, fig. 14.
O. × Charlesworthii 'Theodora'	*Gard. Mag.* 1909, p. 326.
*O. × Goodsonii	
O. × mirum var. 'Emperor of India'	*Journ. Hort.* 1909, i. p. 531.
O. × percultum, Cookson's var.	*Gard. Mag.* 1909, p. 351.
*O. × 'Princess Victoria Alexandra'	*Gard. Mag.* 1909, p. 431.
O. × 'Theodora'	*Journ. Hort.* 1909, i. p. 391.
*O. × Vuylstekeae Crawshayanum	
Oncidium Charlesworthii	*Gard. Chron.* 1909, i. p. 377, fig. 166; *Gard. Mag.* 1909, p. 436; *Journ. Hort.* 1909, i. p. 507.
Phalaenopsis gigantea	*Gard. Chron.* 1909, i. p. 306, fig. 131.
Pleurothallis Birchenallii	*Gard. Chron.* 1909, i. p. 391, fig. 173.
*Spathoglottis plicata alba	

*Sophrocattleya × Blackii .	.
Sophrolaelia × heatonense .	. *Journ. Hort.* 1909, ii. p. 171.
Trichopilia Backhouseana .	. *Gard. Mag.* 1909, p. 421.
Vanda teres	. *Gard. Chron.* 1909, i. p. 365, fig. 161.
V. coerulea	. *Amer. Gard.* 1909, p. 1217.
*V. coerulea var. 'Dreadnought' .	

G. W.

* A painted portrait of those having an asterisk prefixed is preserved in the Royal Horticultural Society's collection.

Orchids and their Commensal Fungi. Evolution in Symbiosis (*continuation*). By N. Bernard (*Ann. Sc. Nat.* vol. ix. Nos. 2–3, pp. 65–191; 4 plates, 16 figs.)—Experiments on the germination and growth of orchid seeds in sterilized nutritive media lead the author to the conclusion that symbiosis is a transitory episode in the life history of the race of orchids, and that in the course of time orchids will enjoy an autonomous life, and therefore it will be possible to germinate and develop them without the aid of commensal fungi.—*S. E. W.*

Paeony, Double Yellow Tree. By R. Rouhaud (*Le Jard.* xxii. 524, p. 377; December 20, 1908; 1 fig.).—*Paeonia Delavayi* var. "Souvenir du Professor Maxim Cornu." The article gives an interesting account of the experiments in hybridization which have eventually produced this Double Yellow Tree paeony. Unfortunately all the plants in 1908 were sterile, but it is hoped that they will be amenable to grafting.—*F. A. W.*

Pear Shoot, Structure of. By Abrial Claude (*La Pomologie Française*, No. 12; 1908). A pear branch in the month of June carries three sorts of buds: (1) those at the base are small, flat, almost atrophied, and the leaves are little developed above them; (2) above these are three or four buds more rounded, the leaves which accompany them are incomplete, destitute of stipules; (3) lastly, above these are more pointed buds accompanied by leaves well developed, provided with stipules at their base. Experience shows that (1) the buds at the base only develop very rarely; (2) the three or four buds following are more apt than the others to transform into flower buds.—*C. H. H.*

Pennisetum hybridum atrosanguineum (*Die Gart.*, p. 254; May 29, 1909).—A very ornamental grass, with long linear purple-tinted leaves. It requires full sun and a moist position.—*G. R.*

Pentstemon, A Comparative Study of the Genus. By L. Krauter, Ph.D. (*Contr. Bot. Lab., Univ. Penn.* iii. 2; 1908).—The genus is thoroughly reviewed, a conservative attitude being adopted towards the establishment of new species, no new names appearing; 148 species are fully described, with their synonymy, following Asa Gray's division of the genus, and the arrangement of the species allows the list to be easily consulted. The descriptions are in English.—*F. J. C.*

Phoenix Roebellini (*Die Gart.*, p. 160; March 27, 1909).—This charming palm is extraordinarily vigorous and will withstand any amount of rough treatment. It may be used like the Aspidistra in places where most plants would soon die.—*G. R.*

Poisoning of Plants by Ammonia. By P. Sorauer (*Internat. phytopath. Dienst.* vol. i. No. 2, 1908, p. 61).—Records a case where Azaleas after travelling by train showed signs in the leaves of poisoning by ammonia gas. Since the truck contained no goods except the Azaleas it was surmised that the ammonia must have emanated from its bottom or sides. Inquiries showed that the same truck had just previously carried bags of sulphate of ammonia, and immediately before that cement. The free lime of the cement had presumably disengaged ammonia gas from the ammonium sulphate. The railway authorities being convinced of the reasonableness of this explanation paid compensation to the owner of the Azaleas!—*G. H. P.*

Poisonous effect of Carbon-monoxide. By K. Suländer (*Beih. Bot. Centralbl.* vol. xxiv. Abth. Heft. 3, pp. 357–383; April 1909). The author finds that even one half per cent. of this gas has a distinctly injurious effect upon the growth of seedlings. It is also injurious to various fungi inhibiting the germination of spores, growth of hyphæ, &c., but no effect upon respiration could be detected by the author's experiments. He suggests that its action may resemble that of chloroform and ether.
G. F. S.-E.

Polyporus. By George F. Atkinson (*Bot. Gaz.* vol. xlvi. pp. 321–338; November 1908; 5 figs.).—Describes the peculiar structure of the spores of *P. lucidus*. There are also notes on host plants, distribution, &c., of this and allied species. A new species is described.
G F. S.-E.

Potato, Leaf-Roll Disease of the. By P. Sorauer (*Internat. Phytopath. Dienst.* vol. i. No. 2, 1908, pp. 33–59).—This article deals with the diseases collectively known under the term Curl (*Kräuselkrankheit*). The author critically reviews the different opinions which have been expressed from time to time as to the causes of the various forms of leaf curl, and points out that very diverse explanations have been given of its cause and different parasitic fungi have been made responsible for it. In a great many cases which he had studied, parasitic fungi and bacteria were entirely absent. He comes to the conclusion that where such fungi or bacteria have been found they are not the primary cause of the trouble but only secondary accompanying features. He seeks to show that the fundamental cause of all the forms of curl lies in disturbances in the normal equilibrium of the enzymes in the parent "set" or tuber used for seed. Owing to the richness in sugar of the tubers predisposed to produce this disease and their excess of certain groups of enzymes they offer an extremely suitable *nidus* for the development of the various bacteria and fungi which have hitherto been looked upon as the primary causes of the disease. A plate showing the different colour reactions given by the juice of healthy and diseased tubers with four enzyme reagents accompanies the paper.—*G. H. P.*

Prairie of South Eastern South Dakota. By Le Roi H. Harvey (*Bot. Gaz.* vol. xlvi. pp. 277–298; October 1908; 4 figs.).—Describes the floral aspect of the prairie at different seasons of the year, and points out that it is preglacial in origin, descended from a tertiary prairie which arose in response to reduced rainfall after the Rocky Mountains were upheaved in the late cretaceous period.

The open xerophytic flora of the crests is gradually invaded, first by "bunch grasses" (tussocks of *Andropogon*, &c.) and then by sod-formers. Shrub associations of Snowberry and *Rhus glabra* advance up the northern slopes and prepare the way for the Bur-Oak-Slippery-Elm association which is found in ravines and on flood-plains.

Trees are absent, and in the author's opinion have never existed upon the true prairie. There is a dry resting season, October to March, and a moist growing season, March to September (with 49·31 cm. of rainfall).

Though the paper is by no means easy to read, it is to be hoped that English readers may be induced to carry out similar observations in this country.—*G. F. S.-E.*

Pterostyrax hispida (*Die Gart.*, p. 357; July 24, 1909).—A handsome shrub with pretty white flowers and large foliage. The time of flowering is during May and June.—*G. R.*

Red Oak (Quercus rubra) and the Black Locust (Robinia Pseudacacia) (*U.S.A. Dept. Agr., Forest Service, Circ.* 58 and 64).—Both these trees, which are of particular value in an economic sense, are well known to us in this country, though the idea of cultivating either for the value of the timber produced has long been abandoned in the British Isles. Certainly the wood of the acacia is particularly lasting when used in connection with the soil, but has never been turned to account in this country. As an ornamental tree the red oak is grown in various parts of Britain, but it is too scarce and of too slow growth to be of value for forest-planting.

Both papers are full of useful information regarding these two trees.
A. D. W.

Red Spider, in Florida, Experiments for the Control of the. By H. M. Russell (*Jour. Econ. Entom.* i. (1908) p. 377).—The red spider (*Tetranychus bimaculatus* Harv.) proved very destructive during the dry season in Florida. Experiments with the following sprays were tried: lime-sulphur (1 lb. lime, 1 lb. sulphur, 25 gallons water, boiled together), lye-sulphur (1 lb. sulphur, ½ lb. lye, 40 gallons water), sulphur (1 oz. to 1 gallon water), and kerosene-soap emulsion (1 part of stock solution to 10 of water). All of these were found successful in greatly reducing the numbers of red spider and (except the last) were without effect upon the plants. One or two rains do not seriously injure the red spider, but continued rains are fatal to a large proportion.—*F. J. C.*

Richardia with Rose-coloured Spathe. By D. Bois (*Rev. Hort.*, August 1, 1909, p. 349).—A hybrid between *R. Rehmanni* and

R. Elliottiana, the former with spathe tinted purplish rose, the latter yellow. The hybrid has a white spathe veined and tinted with rose.

C. T. D.

Richardia Elliottiana. By S. Mottet (*Le Jard.* xxii. 523, p. 363; coloured plate in No. 524).—An interesting horticultural account of the Richardia (Calla) family, several well-known species of which are recapitulated. *R. Elliottiana*, the yellow species with white spots on its leaves (being thus distinct from *R. Pentlandi*, which has no spots), is described at length, and the question raised as to whether the variety with sulphur flowers is a distinct type or not. M. Mottet recommends the name of *R. Elliottiana* var. *sulfurea.* There seems no reason why these varieties should not be as plentiful in the market as the common white Arum Lily. The same greenhouse treatment answers admirably. *R. Elliottiana* is easily propagated (*a*) by seed, which when ripe can be kept in fairly dry sand, and sown February or March, in greenhouse or hot-bed. The seedlings are then treated like the mature plants, and flower in their third year. (*b*) By division of corms, or more simply by separation of the offsets. This can only be done when the corms are vegetating, otherwise they will rot. The pieces are then planted in small pots or loose soil on the floor of a warm house; they usually flower from the end of the second year. As soon as the Richardia is out of flower, the corms must be taken up, dried, and kept away from frost.

F. A. W.

Roots, Emergence of. By R. H. Pond (*Bot. Gaz.* vol. xlvi. pp. 410–421; December 1908; 3 figures).—The author finds that the lateral roots of the Bean and white lupine have no digestive action upon the cortex but simply push their way out from the central cylinder through the cell.—*G. F. S.-E.*

Rose, New Wichurian. By H. Martinet (*Le Jard.* xxiii. 525, p. 3; January 5, 1909).—*Rosa Wichuraiana* 'Joseph Billiard,' cross between *R. Wichuraiana* and Rose 'Mme. Eugène Résal.' Rich yellow apricot, with brilliant pink inside the petals. When fully expanded, the roses measure 7·5 cm. across, with a white centre. The flowers grow in clusters of three to five.—*F. A. W.*

Rudbeckia purpurea. By S. Mottet (*Le Jard.* xxiii. 526, p. 29; January 20, 1909; 2 figs.).—Also known as *Echinacea purpurea*, Moench. Though not rare, this plant deserves to be more widely grown. There are several varieties of the type: *atropurpurea, rosea elegans, intermedia*, 'Winchmore Hill,' &c. All these are best sown in a cold frame, pricked out, and planted in borders at the end of the summer. They will flower in the second year, but are best in the third and fourth, and should be used in clumps.—*F. A. W.*

San José Scale, Self-boiled Lime-Sulphur Mixture as Summer Treatment for. By A. L. Quaintance. (*Jour. Econ. Entom.* ii. 2, 1909, p. 130).—The use of self-boiled lime-sulphur mixture (*Jour. R.H.S.* xxxiv. p. 360) against the San José Scale in the summer has given promising results, the young scales, particularly, being killed. Lead arsenate may be mixed with the lime-sulphur wash, but Paris green should not, as some of the arsenic in the latter case would be lost. In order to avoid injury to the foliage it is essential that the heating of the mixture should be stopped as soon as the lime is slacked.—*F. J. C.*

Saxifrages, Choice. By H. Correvon (*Rev. Hort.*, March 16, 1909, pp. 126–128). An interesting descriptive list, embracing *S. Burseriana major*, rich red, *S. Kotzchyi*, *S. sancta*, *S. pseudosancta*, *S. Elisabethae*, all good yellows, the last considered as the pearl of saxifrages. *S. aretioides*, another yellow, is also highly recommended, as are *S. Grisebachii* and *S. Frederici-Augusti* for their curious habit.—*C. T. D.*

School Gardening. By Miss S. B. Sipe (*U.S.A. Dep. Agr., Off. of Exp. Stn., Bull.* 204; February 1909; figs.).—Contains an account of of the impressions of school gardening gathered by an American teacher on a visit to England to study junior rural education. English teachers will value the criticisms made, though some appear to be based on insufficient knowledge.—*F. J. C.*

Seed-pickling; Influence of Various Fungicides on Germination Capacity and Disinfection of Cereal Grains. By H. P. Burmester (*Zeit. f. Pflanzkr.* vol. xviii. No. 3, 1908, pp. 184–7).—Eleven methods for treating grains of barley, oats, and wheat for prevention of smut, &c., were investigated from the points of view of their effect on the germinating power of the seed and of its disinfection. Copper sulphate applied in various ways gave good results, but must be used cautiously with machine-threshed wheat. Formalin was equally good, and in some respects would work better in practice. The others were practically of no value. Particularly the hot-air and hot-water methods of treatment which have lately been highly spoken of are shown not to possess the great advantages claimed for them.—*G. H. P.*

Seepage and Drainage. By E. T. Tannatt and R. D. Kneale (*U.S.A. Agr. Exp. St., Bull.* 76; February 1909).—Thousands of acres of some of the best agricultural lands of the State have become practically unproductive owing to excessive moisture in the soil, and this pamphlet deals in a masterly way with the most approved methods of drainage and general improvement of such lands for agricultural purposes.—*A. D. W.*

Shrubs, &c., American Native (*U.S.A. Hort. Soc., Wisconsin; Trans.* 1907).—Considerable information concerning native American plants is given in the form of papers read at the meetings of the Wisconsin Horticultural Society.—*F. J. C.*

Soil Carbonates, The Action of Water and Aqueous Solutions upon. By F. K. Cameron and J. M. Bell (*U.S.A. Dep. Agr., Bur. of Soils, Bull.* 49; November 1907). This bulletin is in continuation of previous ones concerning the solubility of sulphates and phosphates of calcium and is upon the same lines as those. A great mass of experimental data is given and the general conclusions arrived at are summarized. The presence of carbon dioxide, sodium chloride and sodium sulphate, ammonium salts, calcium salts, and magnesium salts all appear to increase the solubility of calcium carbonate.—*F. J .C.*

Soils, Absorption of Vapours and Gases by. By H. E. Patten and F. E. Gallagher (*U.S.A. Dep. Agr., Bur. of Soils, Bull.* 51; April 1908).—A summary of previous investigations on the power of soils to absorb vapour of water and other gases is given, and an account of work undertaken with a view to an increase of our knowledge of the extent of this absorption and the conditions under which it takes place. The absorptive capacity of a soil for water vapour is generally higher, the finer the texture of the soil, and the greater the content of humus, and, in general, productive soils have a great capacity for absorbing water vapour. Other gases are absorbed at different rates, the rates, as with water vapour, decreasing with a rise of temperature, with a diminished pressure of the gas, and as the saturation point of the soil is approached. The absorption of water vapour by the soil is accompanied by an evolution of heat (in excess of that given up by the vapour on condensation) and a consequent rise in soil temperature. It is interesting to note that nitrogen is absorbed from the air at a greater rate than oxygen (the exact converse from what is observed in the case of water), while all soils absorb appreciable quantities of ammonia from the air.—*F. J. C.*

Soils, Moisture Content and Physical Condition of. By F. K. Cameron and F. E. Gallagher (*U.S.A. Dep. Agr., Bur. of Soils, Bull.* 50; January 1908).—The methods of moisture determination, &c., are described, together with the experimental data upon which the conclusions are based. It is shown that different (ordinary) plants require about the same percentage of water in the soil to secure the best growths, but that wilting occurs in different soils at very different percentage of water according to the different composition of the soil. Thus wilting began to occur when the percentage fell to 9 per cent. in a calcareous soil, but when it fell to 34 per cent. in a peat soil. It is concluded that that percentage of water in the soil "which makes for the greatest aëration, loosest structure, and, in general, most favourable physical condition of the soil" is the optimum for plant growth.—*F. J. C.*

Strawberries, Climbing. By F. Touraine (*Le Jard.* xxiii. 529, p. 72; March 5, 1909; coloured plate).—'Gemma,' 'Mirabilis,' 'Suavis,' have already been described in these abstracts. In planting, the long close row is to be avoided. Break the soil up well, and see that the roots are distributed and separated, not crushed together in a round hole. Cover the plant well with soil. Water freely after planting. The object being to obtain plenty of runners it is best at first to sacrifice the central flowers. When enough runners have been established the flowers may be allowed to develop. 'Gemma' produces few runners; hence they must be cherished and covered with earth as soon as two or three leaves have been developed. 'Mirabilis' and 'Suavis' have more, so it is best to pinch off the early runners, preserving them only from July onwards. If at the end of a year any plant fails to climb, it should be removed in August, and replaced by suckers from one of the fitter plants. This process of selection is highly important in strawberry growing.—*F. A. W.*

Strawberries for New Hampshire. By H. F. Hall (*U.S.A. Agr. Exp. Sta., New Hampshire, Bull.* 137 ; May 1908).—A careful study of strawberry cultivation both for pleasure and profit has been made by the author, who has thoroughly dealt with the preparation of soil, planting, general cultivation, irrigation with overhead pipes, placed both high and low, arranged on the Skinner system, cost of production, yield and profit per acre, followed by a description of New Hampshire varieties, and a general summary of the work.—*E. F. H.*

Tropaeolums, Variegated. By G. T. Grignan (*Rev. Hort.*, March 16, 1909, p. 132 ; coloured plate).—The plate represents a very prettily variegated type with brilliant scarlet flowers named 'Reine Wilhelmine,' which comes true from seed.—*C. T. D.*

Tuberous Begonia Improvements. By Eugene Vallerand (*Rev. Hort.*, August 1, 1909, pp. 359–362 ; 1 fig).—An interesting account of the development of the tuberous Begonias by hybridization and selection, and of the particular sports which have been developed into distinct sections ; double, crested, spotted, frilled, &c.—*C. T. D.*

Tulips, A New Race of Multiflorous. By A. Mottet (*Rev. Hort.*, August 16, 1909, pp. 382–384 ; 1 fig).—The illustration represents 'Monsieur S. Mottet,' in which the stalk branches and bears several flowers. Fertile and breeds truly. Flower creamy white, sometimes striped or margined with red, petals very pointed, size medium. Bulb produces three to five flowers, according to vigour, by fasciation. By using this as parent a number of other multiflorous varieties have been obtained.
C. T. D.

Ultra-violet Rays and Plant Life. By J. Schulze (*Beih. Bot. Centralbl.* vol. xxv. Abth. 1, Heft 1, pp. 30–80 ; August 1909 ; 2 plates).—Those rays of light which have a wave length of 280 micromillimetres are found by Schulze to retard the streaming of protoplasm, the germination of spores, the growth of fungus hyphae and the processes of cell division. These rays are fatal to bacteria and also to all protoplasm even with only a moderate exposure. They cannot pass through wood, cork, or the cuticle.—*G. F. S.-E.*

Variation in the Daisy, Notes on Numerical. By C. H. Danforth (*Bot. Gaz.* vol. xlvi. pp. 349–356 ; November 1908).—The author discusses the results of the observation of 140,988 ray florets in 5,585 heads from five different localities in America. There are, as in Germany, modes on 21 and 34, but none on 8 and 13. This may be because the American plant is *Chrysanthemum leucanthemum* var. *pinnatifidum* Lecoq and Lamotte, which is not the common German plant. The author found that the mode 34 was predominant between May 27 and June 14. But from July 3–15 the mode on 21 was commonest.

He also found that along the same roadside the rays were more numerous on the north side than on the south. Hence he considers the number of ray florets to be largely an effect of nutrition.

As these ray florets are developed at the ends of the spirals, into which the head can be divided (compare Church) and of which the number is a term in the Fibonacci series and distinctly affected by external conditions, it is clear that the number of ray florets is useless as a systematic character.—*G. F. S.-E.*

Variation, Mathematics of. By Dr. G. Ritter (*Beih. Bot. Centralbl.* vol. xxv. Abth. 1, Heft 1, pp. 1–29; August 1909).—The author gives numerous measurements (number of flowers in heads of *Sanguisorba*, breadth of leaves, length of leaves and leaflets, width of fruits, &c.) which show that the variations are not evenly distributed about a mean, and do not agree with expectation according to the mathematical formulæ of probability. Larger numbers are found to occur at certain figures than would be expected according to the above law. These maxima belong to the Fibonacci series (3, 5, 8, 13, 21, &c., or 1, 3, 4, 7, 11, 18, 29, &c., or the doubles and trebles of these).

When ordinary linear growth or growth in surface (two dimensional growth) is measured, it is found that there are maxima at the figures 10, 13–14, 17–18, 22, 28, 36, 45, and also at 20, 24–25, 31–32, 40, 50–51, 30, 38, 49, 26–27, 33, 42. In the author's tables one finds, for instance, that there are maxima at 14 in fifteen series, and at 17 in sixteen series. The author shows, however, that these particular figures correspond with $10\sqrt{1}$, $10\sqrt{2}$, $10\sqrt{3}$, $10\sqrt{5}$, $10\sqrt{8}$, &c., $10\sqrt{4}$, $10\sqrt{6}$, $10\sqrt{10}$, &c., $10\sqrt{9}$, $10\sqrt{15}$, &c., $10\sqrt{7}$, $10\sqrt{11}$, &c., or ten times the square root in the Fibonacci series.

Similarly the maxima in measurements of nuts and fruits are 10, that is $10 \times \sqrt[3]{1}$, 13–14, or $10 \times \sqrt[3]{2}$ or $\sqrt[3]{3}$, 17 or $10 \times \sqrt[3]{5}$, 20 or $10 \times \sqrt[3]{8}$, 23 or $10 \times \sqrt[3]{13}$, and so on.

These results are of great interest and importance. The season of gathering and degree of nutrition alter the distribution of the figures, but there are always maxima at figures in one or other of the forms of this series. For the suggested explanation, on the ultra mikron ([illegible] of a millimetre) theory, reference must be made to the original.

G. F. S.-E.

Variegated Leaves, Investigations on. By H. Kranzlin (*Zeit. f. Pflanzkr.* vol. xviii. No. 4, 1908, p. 193).—An investigation of the colouring matters in variegated leaves, based on the adsorption method of Tswett. As a result it is found that in all leaves, even in the pure yellow ones, green colouring matter (*chlorophylline*) is present. The colouring matters in a variegated leaf differ only quantitatively, not qualitatively, from those in a healthy green leaf.

There is no difference in the composition of the colouring matters in infectious variegation and non-infectious variegation. The amount of the different colouring matters is always less in the yellow parts of the leaf than in the green, the colouring matters diminishing in relatively different degrees. There is a striking parallelism between the diminution of the green colouring matters (chlorophylline) and of carotin.—*G. H. P.*

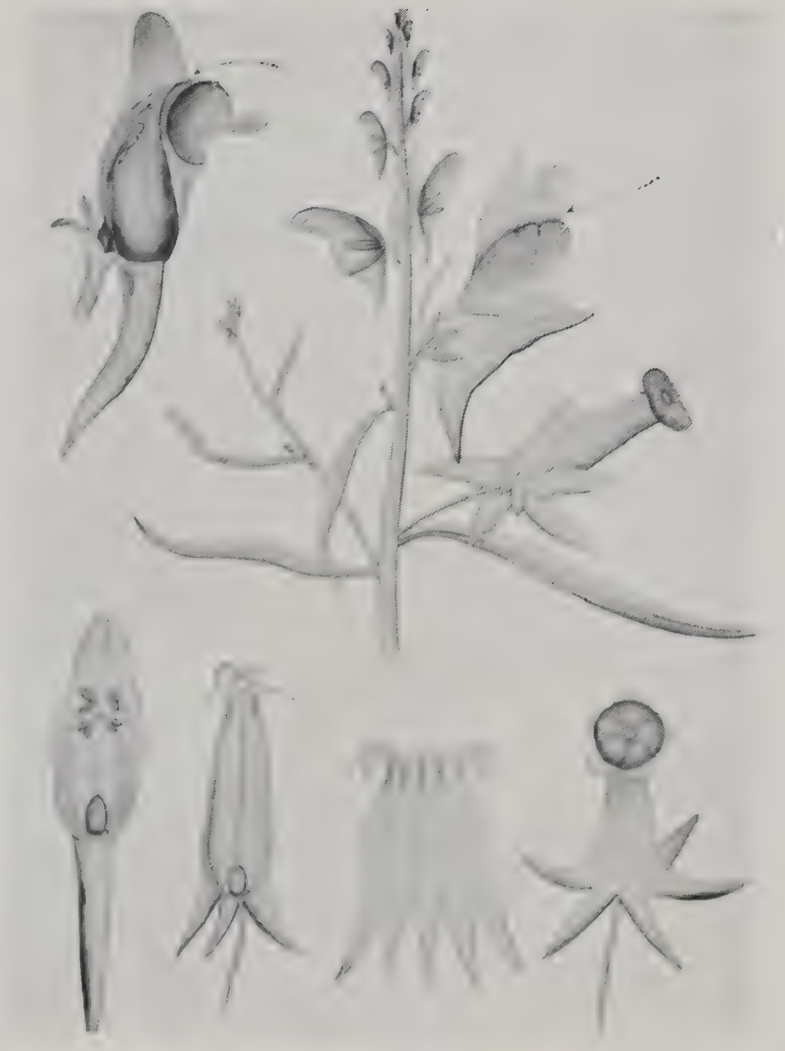

Fig. 114.—The Hemipeloric Variety of the Toadflax (Linaria vulgaris), with Details of the Normal One-spurred and the Peloric Five-spurred Flowers.

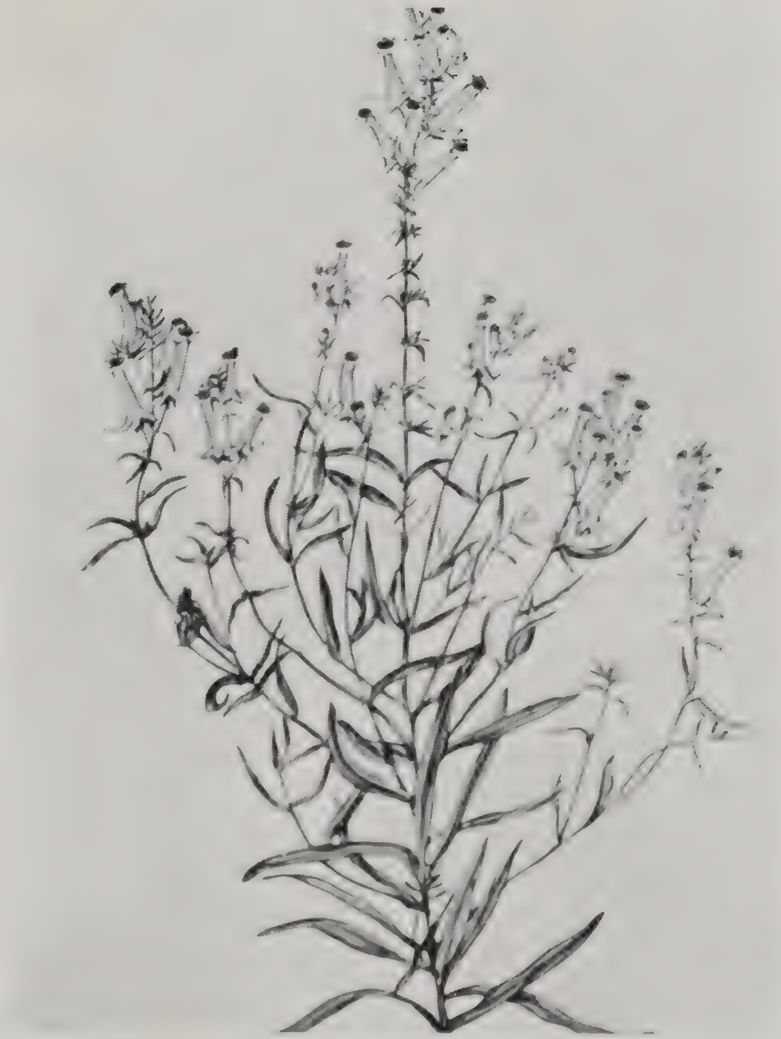

Fig. 115.—The Peloric Variety of the Toadflax (L. vulgaris), having all its Flowers Five-spurred.

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PART III.

THE PRODUCTION OF HORTICULTURAL VARIETIES.

By Professor HUGO DE VRIES.

[Being the second "Masters Lecture," read September 28, 1909.]

THE production of horticultural varieties has attracted the attention of scientific men ever since Darwin pointed out its high significance for the theory of evolution. According to him, varieties are only small species, and if varieties can be produced by natural means, why not species also? A large part of Darwin's work was devoted to the critical examination of the question, whether in this respect there is a real difference between species and varieties or not. If once the common origin of species were admitted, the same conclusion would hold for the natural families, and even for the larger groups of the vegetable and animal kingdom. The main question was the origin of the species, and the main argument was the direct observation of the origin of varieties in horticultural and in agricultural practice.

The production of varieties having thus come to possess a far-reaching scientific significance, it became of interest to submit it to a sharp criticism. There can be no doubt that it really proves the main proposition. But we should like to know the process in its details, and the question arises, how far these are available for scientific purposes. It does not necessarily follow from the evolution theory that species in nature are produced in actually the same manner as varieties are in horticulture. The general laws governing the process must, of course, be the same in both cases, but the details may be different.

In horticultural practice the effects of accidental crossing especially play a large part in the nurseries, where, as a rule, numerous allied species and varieties are cultivated close to one another. The process which horticulturists call the *fixing* of a variety consists essentially in a purification of the new form from the effects of intercrossing with its neighbours. Insects are constantly carrying the pollen from one flower to another. A novelty often makes its first appearance in only one single specimen, and this, of course, will be exposed in a far greater degree to the effects of foreign pollen than a small group of similar plants would be. Next year, a considerable part of the seed will produce "rogues," and these will have to be exterminated. Of course, this process must be repeated during several years, for a longer or a shorter period, according to the propensity of the species for self-fecundation or for cross-pollination.

Besides this most essential but purely practical aim of the process of purification, there is, at least in many cases, a more intrinsic cause for the need of young varieties to be fixed before being brought on the market. At the moment of their first appearance, they often show no more than a slight indication of the character they are able to display. Double flowers may first appear as a slight dilation of a few stamens; variegated varieties may betray themselves by almost invisible white spots on some leaves; and so on. The variety has to pass through a series of intermediate stages before it is sharply and clearly contrasted with the species, so as to attract the attention of the amateur.

A critical study of these well-known phenomena leads to the distinction of two types of varieties. They may be distinguished by the names of *constant* and *ever-sporting* varieties. The first form is seen to be produced at once, and is not connected with the original species otherwise than by the products of accidental crosses. White flowers, as a rule, are not the result of an often repeated, tedious and careful selection of the palest coloured individuals: they appear at once, unexpectedly and without intermediates. Once produced, they are as constant and as true from seed as the parent species itself. The same holds for dwarf varieties, and for numerous other cases. The florist's work in fixing his novelty, in reality, is nothing more than isolation or purification from the effects of insufficient isolation. Complete isolation, whenever practicable, would reach the effect of the whole process in a single year.

On the other hand, we have the ever-sporting varieties. Their variability is such that they often almost reach, or even transgress, the limits of the parent type. Double-flowered varieties may produce at the end of the season, on weak side branches or on stunted specimens, some almost, or even wholly, single flowers. Variegation depends, in a large measure, upon external influences, and the variegated horse-radish (*Cochlearia Armoracia*) may produce pure white or unspotted green leaves, according to the method of cultivation. Such an ever-sporting variety may appear, at first, either in full development or in an extremely small degree. In the latter case it has to be isolated and to be "worked up" (as the phrase goes) before its full worth can be displayed. In such cases the term "fixing" evidently has another theoretical meaning than in the case of constant varieties, although the practical work may be the same for both.

In order to be able to study the real nature of these processes thoroughly, it was necessary to observe the origin of new varieties under experimental conditions. These would, in the first place, have to exclude the possibility of all free intercrossing, and in the second place, allow the drawing up of accurate pedigrees of the ancestors as well as of the descendants of the deviating individual.

I propose to describe a few cases of such an experimental production of varieties, taking instances of the sudden appearance of a constant variety, of the working up of an ever-sporting variety, and of the simultaneous production of quite a number of novelties in a single species.

Linaria vulgaris hemipeloria (fig. 114).—The ordinary toadflax is seen to produce, from time to time, five-spurred flowers. Instead of one spur it has five, instead of four stamens five also, and instead of the two lips of the corolla it has a round, narrow opening surrounded by a wall with five little lips. Ordinarily, such aberrant flowers are found at the base of the spike, in about one instance among tens of thousands of regular structures. They are easily overlooked, since each flower opens only for a few days and then falls off.

Linaria vulgaris peloria (fig. 115).—Besides these almost normal cases, from time to time specimens are observed which bear five-spurred flowers only, to the complete exclusion of others. The first instance of this variety noticed was described by Linné from specimens found in 1742 near Upsala. This was considered so marvellous a circumstance that he applied to it the term *peloria*, which is derived from a Greek word meaning "prodigy." The toadflax is a perennial which multiplies itself abundantly by buds produced in great numbers on its roots. In this way all the plants of a small locality may be derived vegetatively from a single specimen. The peloric variety is thus enabled to hold its place during a series of years. After a time, however, it disappears, since it does not produce any seed. In reality, seeds are not wholly absent, but they are so rare that only very few collectors have succeeded in getting any of them.

There can be no doubt that the peloric variety of Linné had sprung directly from the normal specimens of the ordinary toadflax in its near neighbourhood. In the same way it arose in 1791 near Göttingen in Germany and about 1825 in the vicinity of Berlin. Of late, it has been observed in 1874 near Zandvoort and in 1896 at Oldenzaal in Holland. Other instances could easily be adduced. They prove that the peloric toadflax is a variety which originates, from time to time and in widely scattered localities, from the common species.

Starting from these considerations, I have tried to observe its production directly in order to learn all the details necessary for a thorough understanding of the phenomenon. I cultivated the common species during eight years, giving it all kinds of care, especially excluding the possibility of crossing with allied forms. In the beginning, of course, it did not change, but in the ninth year it produced at once a plant the flowers of which were all peloric, without exception. Since that time my race has reproduced this variety at intervals, partly from the same seed, partly in the succeeding generations. I succeeded in saving some seed from the abnormal specimens, and in the summer of 1898 I had about a hundred flowering plants bearing abundant blossoms, all of which were peloric.

This change, which I could follow through all its stages, was absolutely a sudden one. There were no preliminary foreshadowings, no intermediate types. One could easily imagine that the peloric variety would be produced by a gradual increase, either of the number of the spurs, or of the number of five-spurred flowers on the spikes. Such a slow improvement, however, was not observed. The new variety arose suddenly, without any previous indication. But it arose in more than one specimen, and these at once reproduced it from seed.

Oenothera biennis (fig. 116) and *Oenothera biennis cruciata.* (fig. 117).—Sudden and repeated appearances of striking varieties have been very often recorded in horticultural literature; they constitute a clear and simple type, which the florist usually calls "sports."

In nature the same thing occurs. I shall adduce only one instance, that of the common evening primrose, which, from time to time, produces specimens with very narrow, almost linear petals. Instances of the unexpected appearance of this most curious and constant variety have been observed in Germany and in Holland. They arise from the parent species without previous steps and without intermediate links.

Dahlia fistulosa (fig. 118).—In the same way, some years ago, a tubular Dahlia arose in my cultures. It has its florets rolled into tubes in the opposite way from that of the Cactus Dahlia, the upper surface being within the tube. It has no horticultural value, but it was interesting to observe its sudden appearance in guarded cultures.

Chrysanthemum segetum plenum (fig. 119).—Double flowers and double flower-heads of Composites are among the most common instances of ever-sporting varieties. I have produced such a form from the ordinary corn-marigold under the strict conditions of experimental cultures. It has been possible thereby to follow the process in all its steps from the very beginning. I started from the large-flowered variety of the gardens, which has, on an average, a row of twenty-one florets on each head. There is, of course, a wide range of fluctuating variability in this number, which may go up to twenty-four and down to nine.

My plan was to select the plants which had the greatest number of rays on the their flower-heads. The effect of this plan could be expected to be twofold. In the first place, the average number of the rays might be gradually increased, and the brightness of the variety might thereby be improved. But, on the other hand, there was a chance of catching the double variety, provided this lay hidden among the plants of my culture. If this were the case, this variety would probably be brought to light, and even in a short time. On the other hand, however, the progress brought about by selection would be but slight and, from a horticultural point of view, an insignificant one.

Chance favoured me in this case. After the lapse of four years, I succeeded in increasing the number of rays considerably, by selecting specimens with thirty-four, forty-eight, sixty-six and ultimately with about a hundred rays. From these, the next year, the full double variety arose, with over two hundred rays on many flower-heads. In the course of five years the double type had been fixed. There was, of course, no need for purification from the influence of crosses, since such had been excluded from the very first. But the novelty had betrayed itself through a slight

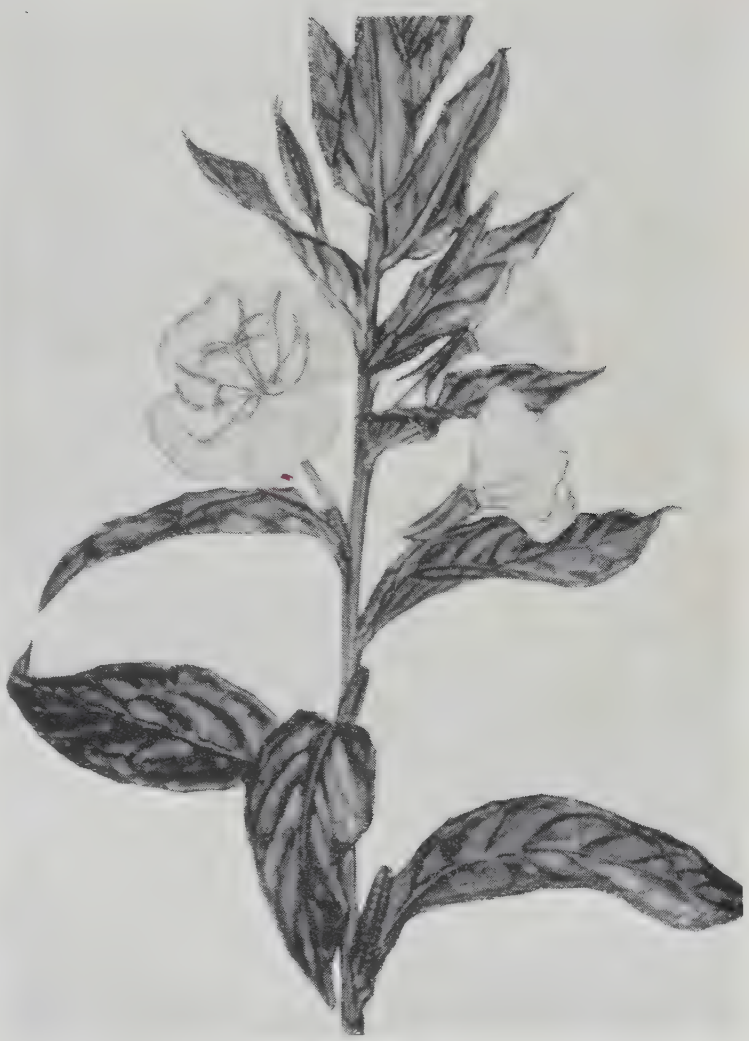

Fig. 116.—Evening Primrose (Oenothera biennis).

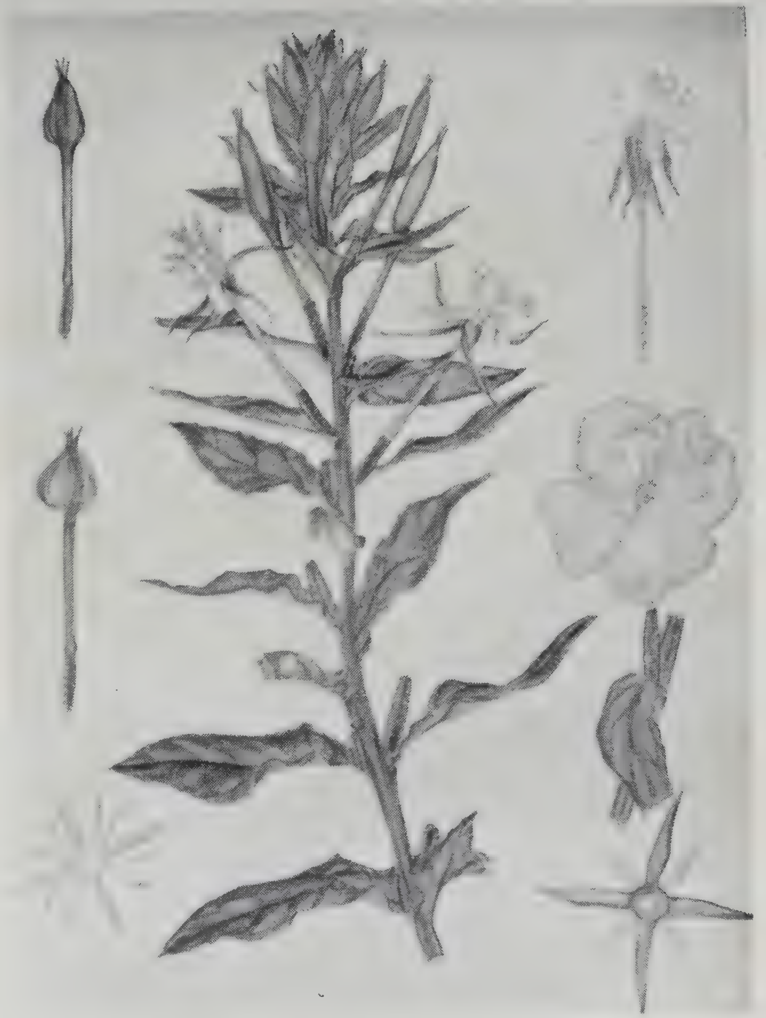

Fig. 117.—Evening Primrose (Oe. biennis cruciata) with Linear Petals and Details of the Flowers, and a Flower of the Ordinary Form.

(*To face page* 324.)

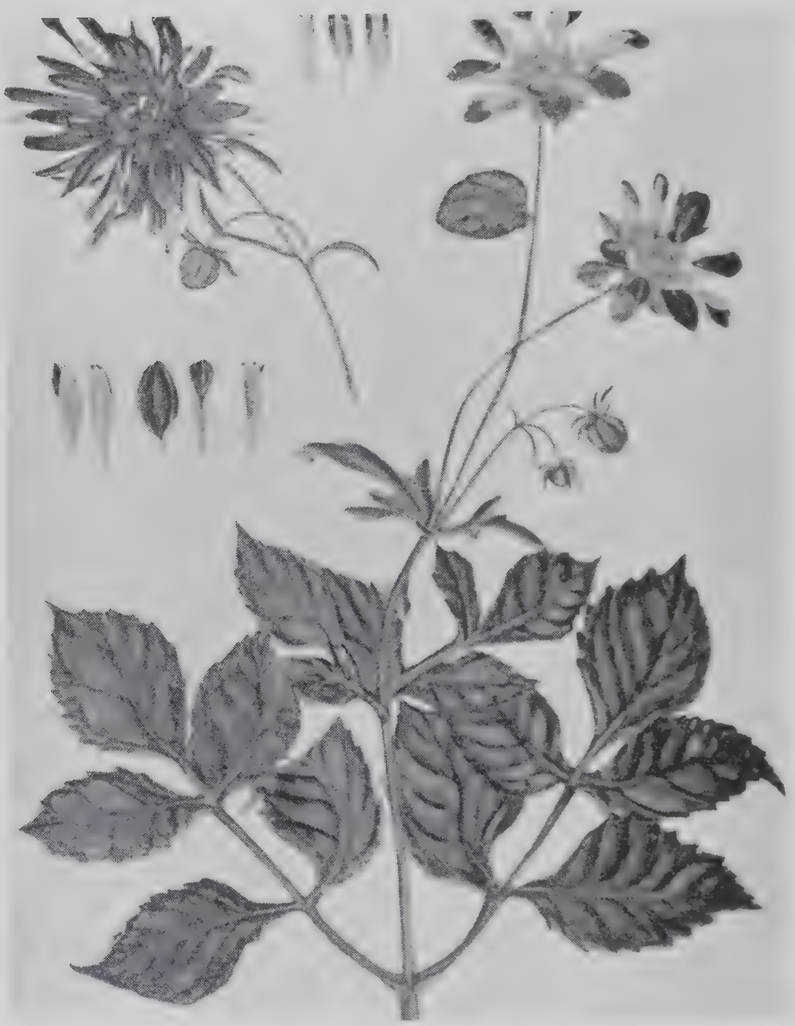

Fig. 118.—Dahlia fistulosa and a Flower-head of a Cactus Dahlia, with isolated Florets of both Varieties.

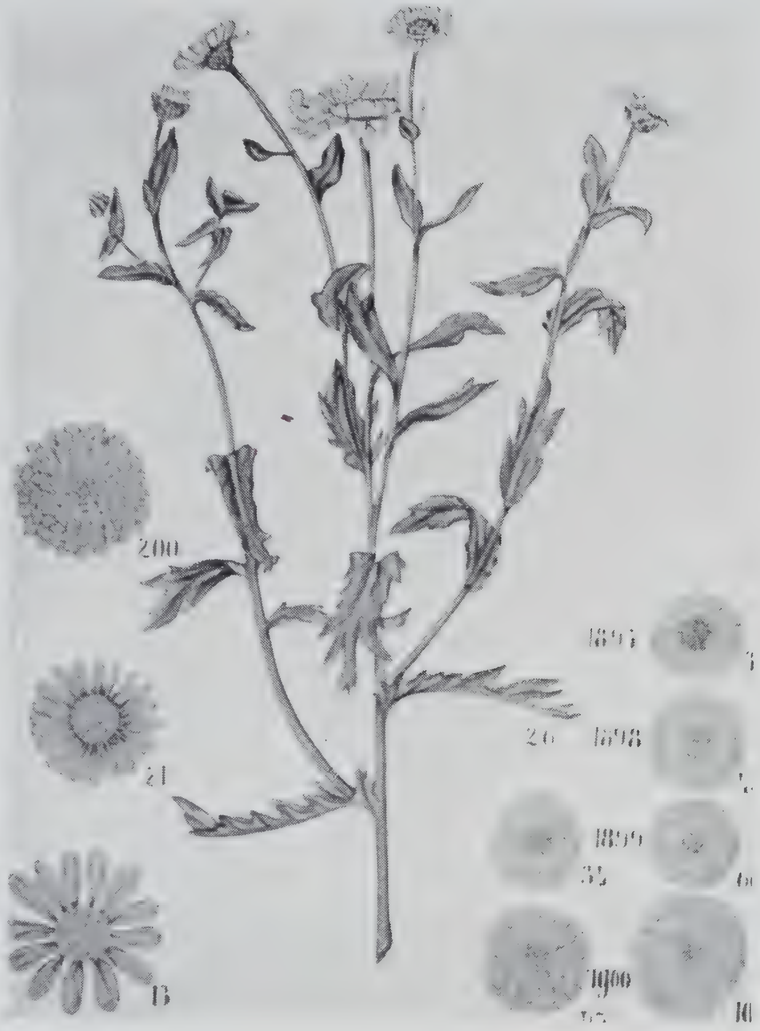

Fig. 119.—The Double Corn-Marigold (Chrysanthemum segetum). Details showing the Progress of Doubling in Ordinary Flower-heads and in Extreme Cases.

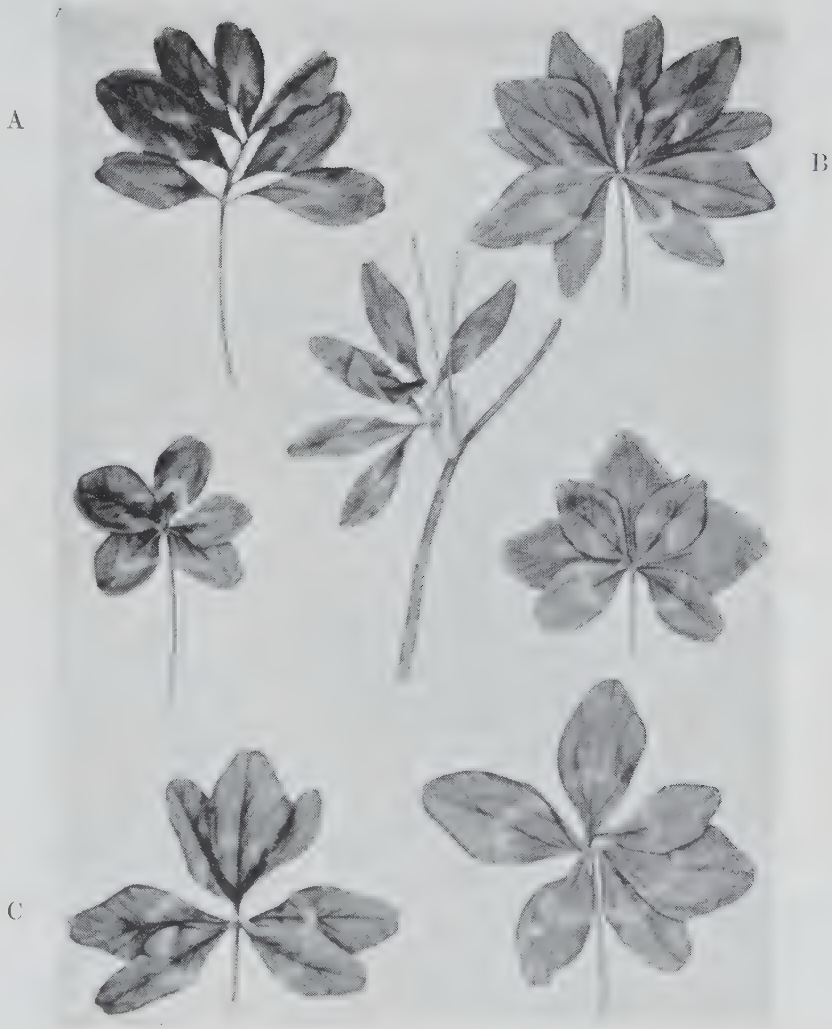

Fig. 120.—Five-leaved Race of Red Clover (Trifolium pratense), Five, Six, or Seven Leaflets on a Stalk. A shows a Pinnate Leaf; B, a Doubled Leaf; and C, the Origin of a Seven-bladed Leaf by Lateral Incision of the Three Main Blades.

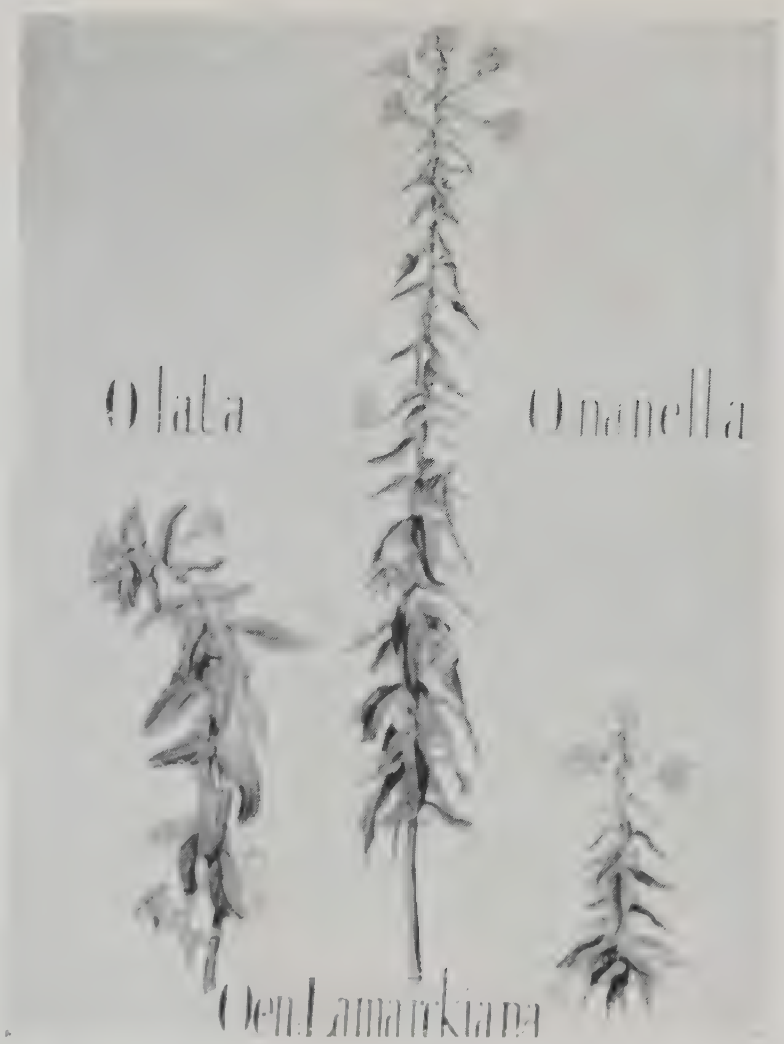

FIG. 121.—THE EVENING PRIMROSE (OENOTHERA LAMARCKIANA) AND TWO OF THE MUTANTS, OE. LATA AND OE. NANELLA, WHICH IT IS PRODUCING YEARLY IN THE BOTANIC GARDEN AT AMSTERDAM.

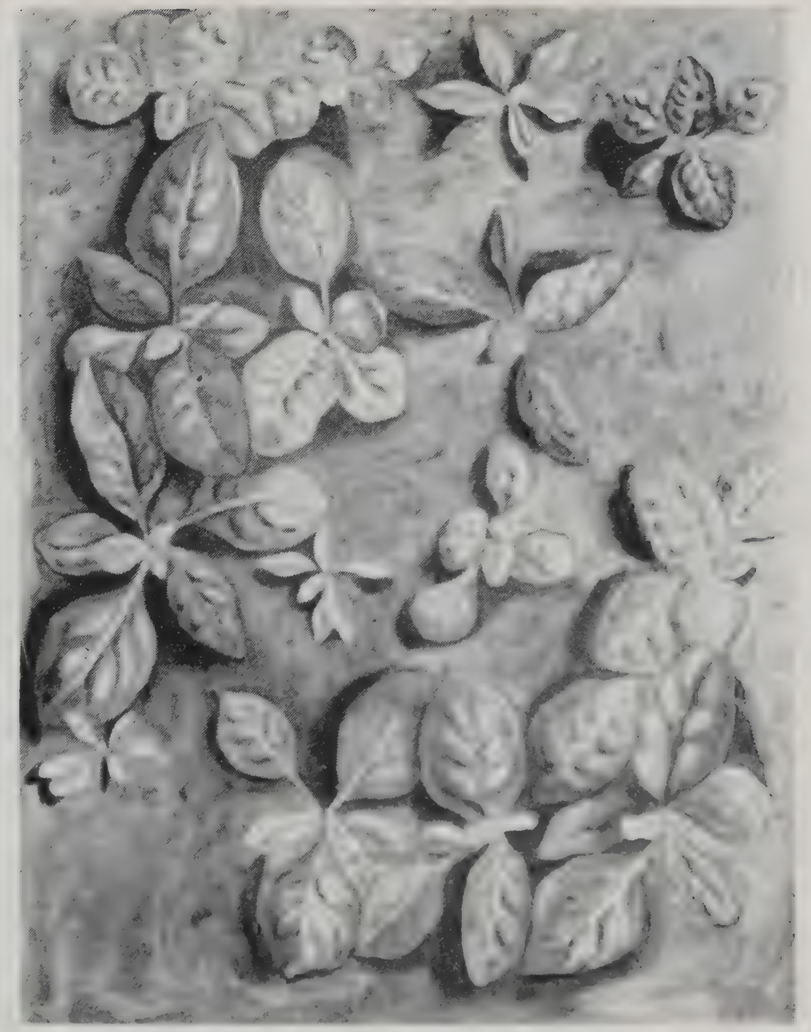

FIG. 122.—SEEDLINGS OF ONE PARENT PLANT OF OENOTHERA LAMARCKIANA, SHOWING THREE DIFFERENT TYPES: THE ORDINARY FORM, THE VAR. LATA WITH ROUNDED LEAVES, AND THE VAR. ALBIDA WITH NARROW LEAVES.

(To face page 325.)

increase in the number of the rays, there being a few more than could be ascribed to ordinary fluctuating variability. From this small indication it had to be worked up to the full display of all its potentialities. Finally, it reached the type which is normal for other double composites, and since that time it has remained constant.

Five-leaved Clover (fig. 120).—Another instance of the chance occurrence of an ever-sporting variety in a dormant condition is the five-leaved clover. The four-bladed clover leaf is of common occurrence. If one isolates such plants and breeds from them, two things may happen. Either there is hardly any progress and four leaves remain rare, or there is a sudden improvement which may easily be worked up into a variety extraordinarily rich in leaves of the more compound type. In this case, a hidden instance of the ever-sporting variety was accidentally caught. I had the good luck of finding such a promising individual twenty years ago, and from it produced, in a few years, a variety which is wholly constant, although extremely dependent on conditions of good treatment.

Oenothera Lamarckiana var. *nanella* (fig. 121).—My last instance is the large-flowered evening primrose, a plant which is producing annually about a dozen new forms. I do not say that, in the long run, it produces indefinite numbers of varieties, but that the same novelties spring from it almost every year. This, however, is a most curious feature and gives us the means of studying the origin of new forms in all its details. It allows the repetition of experiments as often as may be wished, and the study of the influence of all kinds of external conditions upon the phenomenon. For about twenty years I have followed this process, cultivating hundreds of thousands of single plants.

The most remarkable variety is a dwarf which reaches scarcely half the size of the normal plant, and which begins to flower when only about four inches high. Its flowers, however, are almost as large as those of the parent species. From this you see that it is a very showy little plant. In order to display its full beauty, it has to be cultivated as a biennial, since annual specimens are ordinarily too weak. It produces an abundance of seeds, which, when purely fertilized, reproduce the variety without exception.

The interesting feature of this dwarf, however, is the fact of its repeated production by the parent species. It appears annually, even when cross-pollination is carefully excluded. Moreover, it appears in relatively considerable numbers, one or two of every hundred seedlings being dwarfs. These are easily detected, even when still very young plants with only a few leaves.

Oenothera Lamarckiana. Mutation in the lata *family* (fig. 122).—Besides the dwarfs, other new types occur, and they also can be detected in the seedling stage. In the first place, we have the var. *lata*, which betrays itself by broader leaves with rounded tips and of a paler green. It never becomes as tall as the parent plant, and is easily distinguished by its weak stems and bending tips. Another common type has narrow and almost whitish leaves: thence its name of *albida*. It is the most easily recognized deviation among the seedlings, but also the most difficult one to cultivate on account of its almost insufficient supply of chlorophyll.

Other forms are the vars. *rubrinervis* and *gigas*, both of them large-flowered and stout types, which are of a more rare occurrence. But it is needless to enumerate the whole series of novelties which this evening primrose produces almost annually in my experiments.

[A number of lantern slides showing the "mutants," which have sprung from the original evening primrose, and the methods adopted to secure isolation, concluded the lecture.]

be not too deep ; it will be found that the leaves above the cut will not flag for lack of water.

What, then, is the function of the outer series of tubes ? To consider this we must now leave the roots and devote our attention to the leaves. Leaves have been called the lungs of plants, but this simile hardly describes their functions correctly. Leaves are the organs in which the crude sap from the roots is transformed by the agency of light into food products from which roots, stems, leaves, in fact all parts of the plant, are built up. The three great necessities for this process are light, air, and water. The vital importance of light is easily appreciated when we study the arrangement of leaves upon a stem. It will be seen that the scheme of disposition is such as to ensure for each the maximum amount of light. The importance of light lies in the fact that it is the only source from which the chemical energy required for the processes of construction of food material can be obtained. Before, however, we consider this in more detail we will briefly see what part air takes in the living plants.

It is commonly thought that leaves and wood are solid masses of tissue, but this is of course far from being so. Every leaf has its ventilating system, for all living parts of plants breathe as animals do. Air passes through the spaces between the leaf cells, and its entrance and exit are carefully regulated by the stomata of the leaves, which open and close according to requirements. The bark requires also its supply of fresh air, and the small corky dots, "lenticels," on the branches of all fruit trees are so many inlets for fresh air.

The process of combining the raw materials taken in by the root and the carbon dioxide from the air to make the building material, "elaborated sap," is called assimilation, and its exact nature is still under discussion, but for our purpose "what happens" will suffice without considering "how it happens."

The place in which the work of assimilation is done is the protoplasm of the cell : so far can we trace this remarkable process which still baffles chemical research. Given a sufficient supply of water, certain inorganic salts, air and light, the protoplast produces a substance nearly akin to sugar. This process goes on for a certain time until the solution of sugar in the cell sap gets stronger and stronger, and as the sugar increases the energy of the protoplasm decreases until it comes to a standstill. The problem has now to be solved how to get rid of this sugar so that the formative process may continue. It is solved in a simple way. The sugar is changed into starch, and in this form it has no deterrent effect upon the protoplast which is free to continue its work, which it does as long as the three conditions, light, air, and water are present. But when the light goes at the end of the day the process stops and the leaf has now a large supply of starch stored within its tissues. How is it to get rid of this supply so that it may be free upon the return of daylight to continue its work ? Owing to the size of the starch grains and to the fact that, as we have seen, the tubes along which the sap is conveyed are not continuous, it is evident that the starch cannot be passed down the leaf stalk into the roots and stems in its existing state. This difficulty is solved by changing it back once more into a sugar solution, in which form it transfuses through the plant with great ease. This, then, is the elaborated sap, the true plant *food* of which the crude sap arising from the roots only forms part of the raw material.

The outer system of tubes referred to above is entirely occupied with the transport of this material. This is easily seen to be so when a tree receives an injury and the outer bark is removed. In time new bark will be formed from above, thus proving that it is the downward and outer flow of sap which is the material from which the bark is formed.

It may be asked what determines the flow of this formative sap in the direction required to roots, bark, or fruits? To understand this we must briefly consider the force of osmosis.

If in a basin of water we float a porous cup of unglazed earthenware or of parchment, containing a strong solution of salt, in a few hours it will be found that some of the salt has filtered through into the water surrounding the cup. This transfusion is called osmosis, and it will continue until the solutions in the floating cup and the water in the basin are of exactly the same strength. Therefore a steady flow of the chemical salt is produced in one direction. It is precisely the same process that decides where in the plant the sap shall flow to. For instance, while the leaves are actively producing sugar which is conveyed to the root, the roots may be storing it as starch. As each grain of starch is formed in the root so much sugar is consumed, and the sap is therefore less rich in sugar than the sap in cells above. A steady flow of sugar is therefore maintained just so long as the transforming process in the roots continues.

This is a brief outline of the translocation of food material formed in the leaves and carried to the stems or roots.

We may now consider how this supply is drawn upon for the nourishment of fresh growths. The most convenient example of this is the development of the bud. The buds are developed in the axils of the leaves, and an examination of a strong shoot in winter will reveal a certain difference between the buds situated on different parts of the shoot. The buds at the base will be seen to be very small, while those midway up the shoot are conspicuous and are covered with a downy felt. The latter are fruit buds. Higher up the shoot the buds again decrease in size, except perhaps the terminal bud of the shoot, which may be a fruit bud again. The shoot can therefore be divided into three distinct parts: dormant buds at base, fruit buds at the centre, and above these the wood buds, viz. those which will produce only fresh branches and no fruit. It may be asked: What is the cause of the difference of these buds? It is entirely a question of development. Given a sufficient food-supply all buds will develop into fruit buds, but a deficiency results in either dormant or growth buds only. Bearing in mind what has been said about the importance of light, it will be seen that this factor alone will account for the whole difference of the buds shown on the shoot. The dormant buds at the base were nourished by leaves which were to a certain extent shaded by those above and therefore not so capable of forming food-products. The leaves above these are the most favourably situated and are produced at a period of maximum sunshine, midsummer, and their activity is therefore the greatest. The leaves higher still are borne on the second or autumn growth, during which weather conditions are not so favourable and consequently produce only wood buds. The leaves at the extreme end of the shoot are, however, in an excellent position and, moreover, are in a rosette, which results in many leaves supplying all their food to one bud, and the result is frequently a terminal fruit bud.

In varieties of great vigour and with a large leaf-surface the activity of one season is often sufficient to produce a fruit bud when it is very favourably placed. The formation of fruit buds and spurs in varieties of less vigour and of buds less well situated as to light and air is a matter of two seasons. Let us assume that the shoot above referred to is unpruned, and follow the development of the different buds the following season. The dormant buds at the base of the shoot will remain unaltered. The fruit buds will produce their blossoms and a supply of leaves which will feed the ensuing fruit. The wood buds above these, however, may take one of two courses. If the supply of sap be plentiful they will develop into moderate shoots. If, on the other hand, the supply be inadequate, each bud will produce a rosette of five leaves which will nourish a fruit bud in their midst exactly as did the terminal bud of last season, and this bud will of course produce fruit the next season.

If pruning is done in the winter, the results of cutting to the different buds will naturally vary greatly. When the branch is cut down to the dormant buds at the base the result is that the roots being capable of supplying the whole branch with sap will send to one or two buds the amount intended for the whole branch. These buds, thus stimulated, will commence a very strong growth, and this is of course the reason that hard pruning encourages strong growth.

If the branch is cut down to a fruit bud the result will be that these will develop into spurs, a development which we will briefly consider. A spur is a dwarf branch. If we imagine that the spaces between the leaves on a normal shoot were elastic and that it were possible to extend or close the shoot like a telescope, we shall see how this applies. When extended on the branch, the leaves are, let us say, one inch apart. When we push in the branch the leaves will naturally be quite close together and have an appearance exactly similar to that of a spur, the terminal fruit bud with its rosette of leaves. The spur is then an unextended branch, and the rugged appearance of its bark is merely due to the leaf scars being quite close together. Each of these leaves will produce in their axils a small bud which will, according to circumstances, remain dormant, or in time develop into another spur exactly as on the extended branch considered above.

We may now briefly refer to the case of the branch should the tree be moved. This means in effect that the roots will be damaged, that new roots will have to be made from the foodstuffs stored in the stem and coarse roots. But this is a slow process, and until the old root system is entirely replaced it means that the branches will have to go short of their usual supply of sap. The effect upon them will be marked. No strong growth will be made, and even if cut back to the dormant bud a weak shoot only will result. If the branch is unpruned the shoots will put forth their flowers, but lacking sufficient sap, fruit will probably not set, and if it does there will be a lack of nourishment and consequently small, undersized fruit. The leaves will be small for the same reason, and the result will be that the supply of food material that is made—not being used up in the production of growth, will all be used in making fruit buds.

Thus we see how it is that root-pruning will throw a tree into fruit by allowing the elaborated (organic) sap to predominate over the crude (inorganic). This puts the whole question of fruitfulness into a nutshell. Predominance of root sap means growth ; predominance of leaf sap, fruit.

This is illustrated in another way. It is often said that canker causes a tree to fruit. It is not, of course, the disease that causes this, but merely that the elaborated sap on its way to stems and roots is stopped by the damaged bark and held up in the branch. The buds therefore get an abnormal supply of food material which aids their development into fruit buds. The ancient practice of bark-ringing is based on the same principle, as is also that of wassailing the apple trees. Readers of Phillpotts' "Children of the Mist" will remember the "wassailing" of the Devonshire orchard described therein. The ceremony of discharging guns at the trees had no doubt the practical result of causing many wounds in which canker would establish itself and thus check the downward sap flow, and thus the fruitfulness which was believed to follow this ceremony would be capable of a simple explanation. Another well-known practice, that of bending down a branch to make it more fruitful, also owes its success to the fact that it would be more difficult for the elaborated sap to flow out of the branch into the stem and thence to the roots.

All fruit-growers will know how easily the middle portion of a fan-trained tree will grow compared with the side branches which are parallel to the ground. This is due to the fact that the straighter the passage the quicker the flow of water. The centre branches take more than their share of root sap, and the freedom with which the elaborated product flows back to the root prevents those strong branches attaining the fruitfulness of those situated at the sides.

Other examples might be given, but enough has been said to illustrate the point and to show how a knowledge of physiology may be of value to the pruner. It is manifestly impossible in the short space of a lecture to do more than roughly sketch these possibilities.

In the different conditions in which the pruner finds his subjects, in their varying constitutions and habits, it is evident that mere dogmatic rules for pruning cannot suffice. A knowledge of the principles of plant growth will place him on a sure foundation from whence he can estimate the value of rules and their exceptions, and will lead him to approach his work in the spirit which is expressed in the motto of our sister Society, "Practice with Science!"

RENAISSANCE GARDENS.

By T. H. Mawson, Hon.A.R.I.B.A.

[Read October 12, 1909.]

In an inquiry into the character and design of the gardens of the Renaissance one must naturally make an inquiry into the term itself and what it expresses. We must not confine ourselves to the restricted sense in which the term is used in our own country, but ascertain its meaning in the world's annals, embracing in our inquiry not alone gardens, but architecture, sculpture, and painting, and see that it counts for a large place in the world's history.

The word is used in modern language in a very loose sense. It is always difficult as well as unwise to limit a generic term, since we should allow most words an expansive meaning; but in order to get a conception of what is to be conveyed by its use it is a good plan to get back to what it expresses at its best period, when the great movement found its grandest presentment. It is always a difficulty to define the beginning of a movement and its bounds.

To make a short cut for the heart of it I may say that Michael Angelo was the greatest artistic genius of the Renaissance. You may take his name as the leading light of that company of architects, sculptors, painters, and designers who fired the Renaissance light in its most glorious period, and you may associate with his name others like-minded, such as Brunelleschi, Bramante, Leonardo da Vinci, Perugini, Raphael, Alberti, Benvenuto Cellini, and with Dante in literature. The genius of these men was universal and their mental powers were great, like his whose name we have chosen as representative head and leader.

Their works tower up to-day like monuments around the classic ground of Rome, Naples, Florence, and Venice. There instinctively springs to our minds at the very mention of their names and their scenic ground those subtle and noble emotions which those who respond to great art are capable of. Although the greatest of the Renaissance champions had their homes in Italy, where was the spring of the movement, we must not confine its bounds to that sunny clime - the foster-mother of the arts—for rich and varied treasures of the movement are to be found in France, Spain, and England, and in lesser degree in other countries, and in a modern way in America. The Renaissance is an inspiring and scholarly form of the ancient classicalism revived to meet the changed conditions of life from medieval times, and to a certain extent to express what is monumental and scholarly at the present day. It is a form of art which is adapted to the expression of a considered scheme on a grand and stately scale. It is the antithesis of the individualism and impressionism of the present day, being more scholarly and deliberate than the sleight-of-hand of modern-day art and tricksters.

It may be maintained with truth that, in some instances, as in the Luxembourg gardens and those of the Tuileries and Versailles, where is expressed the French interpretation of Renaissance garden design, that it is too heavy and too stately for the ordinary mortal. These examples are, perhaps, scarcely representative of the style, although illustrative of it. They are schemes too vast to comprehend, yet no one can help but be impressed with the spacious attempts to achieve the classic and the grandeur of their vistas, but they are not an epitome of the rich and varied treasure-house of design over which is inscribed the inspiring word "Renaissance."

The Renaissance school of design is usually associated in the minds of many who are partially educated with those formal bird's-eye views such as are to be seen in old sixteenth, seventeenth, and early eighteenth century books, with everything blocked in geometrically square: courts, circles, and radiating avenues of trees, and usually with one half of the mansion almost, if not exactly, balancing the other half.

The grandiose schemes of the French Renaissance gardeners and designers, such as Pierre Lescot, Jean Bullant, and Le Notre, and their gardens and mansions, have never found much favour in England. In order to portray the English ideal and the French ideal side by side we might make the comparison between Windsor Castle with all its picturesque disarray of battlements and towers and Versailles with all its ordered symmetry. The former expresses what is popular in England, and the latter is expressive of the phase of art which is nationally the admiration of the French. Whatever we may be inclined to think of the French Renaissance we cannot but admire their logical and spacious planning, and this is where I find most amateurs who set about laying out their gardens on the freer or landscape style nearly always get stranded.

They do piece after piece and do them well, but somehow they find that after they have done one or two portions the former portion will not line up with the later contemplated pieces. Consequently, they have to begin pulling back, replanting, and altering, or perhaps have to call in some one to give them a comprehensive scheme in plan. For my part I can admire and wonder at these vast conceptions of the Frenchmen, and if a man is going to be an all-round garden designer, or an all-round garden admirer for that matter, he must quietly imbibe the spirit which compassed their conception, although he may never be called upon to do anything approaching their scale or vastness.

The designs of Androuet du Cerceau, 1510-1575, the most scholarly of the French draughtsmen, and one of the best designers of this school, do not please universally on account of their nakedness and as some would say their stiffness. But as everyone knows, or ought to know, they were not intended to appear unclothed with verdure; it is for the eye and mind of the artist to clothe the skeleton view in imagination.

I would like to make a little divergence at this point, to beg indulgence and toleration for designs of this kind, although they may appear at first sight obsolete to a modern mind, and for much that may be classed with them for the same reason, such as the seemingly stiff representations of rocks and trees on many or most of the old masters' paintings. The ancients were schooled in what it takes most moderns half a lifetime to find out—namely, how to express by suggestions the essentials of their thoughts, and to eliminate, or at the best merely suggest the non-essential, or else to touch it in with a faint suggestiveness that would heighten the human or religious sentiment upon which they wished to rivet the spectators' attention. We moderns miss the essential mostly by enshrouding it in a wealth of painfully correct detail, and later, finding out our inabilities, we try to reach it by a series of flukes, or impressionism, which hit it on an average about once in ten times, but the majority of its practitioners do not know what they are aiming at. Ruskin remarks somewhere concerning the impossibility of getting draughtsmen to portray the expressions of the Egyptian deities for his book, "The Ethics of the Dust," that they give you a lot of dabble and scrabble detail of cracks and textures, but the expression, which is only caught after years of practice and unerring sweep of line and which is conveyed by a few strokes of a master hand, they miss altogether.

No amount of detail will ever make a garden. It is one of the marks of the feminine mind that you get a lot of talk about colours and the pattern of the garden gate and about the birds and other little things without which I grant you cannot have a garden replete, but often they ignore the design proper. I do not put any slight upon detail, but you must have the grand conception whereupon to build and embellish, and this is the attitude I beg you will adopt when you see ancient examples of the Renaissance gardens. I want you to grasp the way these scholarly draughtsmen convey the characteristic features which they wish to pronounce. These old designers, whatever object they set their inventive or artistic powers to work upon, conceived their designs whole in perspective, not piecemeal as we do. Back and front, end and side, were all conceived in oneness and entirety.

> In the elder days of Art,
>   Builders wrought with greatest care
> Each minute and unseen part,
>   For the Gods see everywhere.

We must ever remember that in art it is impossible to do justice to the whole of any subject, or to present to the full our conceptions by any or all the media which we use to convey thought; either by books, or by lectures, or by illustrations, separate or combined. The great masters recognized this from the outset, and applied themselves to the essentials only, therefore in place of literal transcriptions and hard-drawn facts they give us an infinite suggestiveness, which serves to call the mind of their readers or beholders into play. Oliver Wendell Holmes hit the nail on the head when he declared words to be only algebraic signs for thoughts, and Robert Browning summed up the case when he made Andrea del Sarto exclaim: "A man's reach should exceed his grasp, or what's a heaven for?" The great men of the glorious Renaissance were idealists. They had an inward vision of beauty that found expression in the cathedrals, gardens, and mansions, in their literature, their poems and their music. Their work was eloquent with a subdued modesty, refinement, and nobility of mind. Their whole lives were lived in an atmosphere of intense idealism, and from such their whole surroundings vibrate with a resonance that is almost altogether lacking in modern art and work. We concentrate too much upon the medium; they always kept the inward ideal before them. I trust you will pardon this digression, which is in one sense not a digression, but part of the logical argument as to what is implied in the term.

I know the ingrained tendency in the mind of an ardent horticulturist is to relegate the classicalist to the class of the pedant, saying that his disciplined and drilled ideas lack freshness, as does also the modern impressionist artist, who proclaims that he lives in the greeneries and receives his inspirations fresh from the bosom of Nature, and he dubs the classical as the glue-pot form of art, describing their way as that of adding or sticking piece to piece in order to secure thereby a semblance to that which has life, and which appellation, I doubt not, certain dry-as-dust professors of the academic persuasion warrant.

I counsel, however, that you give the subject a fair hearing and be not carried away with hasty persuasion, and you will come to the conclusion that most do whose mental education matures, although we may resent the great, august presence of the classic at first, which looms upon our artistic vision in somewhat the same fashion as a resurrected schoolmaster would, nevertheless you will hail it in the end. The classic or the Renaissance is really the storehouse and compiler of that which we glean in the fields of experiment, eliminating from it what is non-essential, and as a certain cute Scotchman (an artist and not a gardener this time) said: "Every man who begins with the Dutch style of art finishes with the classic." For, although like him, I prefer the romantic sentiment of haphazard which is a synonym for what is English abroad, both in gardenage and in the charm of our old-world villages, together with the quaint unstudied dignity of our provincial boroughs with their traditions and periods written on their time-stained edifices, yet for myself I will back Wilkie, the Scotchman. He succeeded admirably with such rustic subjects as "The Village Politicians" and all their picturesque and untidy litter, and with combinations of rough and tumble-down architecture and the mazy intermixture of country swains as in "The Village Feast" in the National Gallery, but the classic, in which he tried hard to star, proved too much for him. Nevertheless his axiom is true. Every man who begins with the rustic style of art if properly educated ends with the classic.

Every artist who progresses educationally in his art must gravitate towards that which has definite order, where the individual is suppressed. Many of our artists, Reynolds, Romney, Opie, and others, including Wilkie himself, tried to excel in classical compositions and failed in the attempt; the personality in each proved too strong to suppress.

Others might be cited who could produce classic compositions and had to come down to landscape transcript and topographical art in order to gain a livelihood, for the public does not understand or appreciate the suppression of the Ego. There are one or two living artists so proficient in the classic that they can render it popular and eminently picturesque. The classic is, however, the hidden and the misunderstood type of beauty, corresponding to the quality which is so much needed in a city, in the individual, and in its architecture, in fact in everything: namely, the suppression of the individual for the public good, and every man, to apply

Wilkie's declaration morally, who starts with that which most appeals to himself and is truly educated in his progress, ends in the pursuit of that which makes for the suppression of self.

The classic which is the parent of the Renaissance (for there is no real classic to-day) is more the scholar's domain; the Renaissance garden is the scholar's garden, and a scholar is highly selective. His motto is: "A little, but good." He does not wish for the interminable mazy overgrowth, but wants a few select examples, yet of high class, and with ample room for display. If one may illustrate the method of a classicalist or scholar, out of thirty good models he evolves one perfect example much in the same way that the Greek sculptors did in their perfect statues. They took a part from one and a part from another, selecting always the perfect and eliminating what was imperfect until they got a Venus of Milo or a Hercules as near to the perfection of the human form as possible. They fused the whole together in the furnace of their mind, and the result was one perfected presentment, not a composite collection after the derided glue-pot order.

The Renaissance or classic method of design is not easy of accomplishment, its large spaces are apt to become vacant looking, and the ornamentation applied often looks meagre, and then we set to work to atone for it by multiplicities. I agree with certain who ask, May we not get too austere in the pursuit of this style, and may not the result be too bald? Most decidedly so, and there are many houses and some gardens that are after this style that we could mention which are positively forbidding.

This is one of the dangers, but in avoiding Scylla we may encounter Charybdis. Because certain fail of the accomplishment (and which of us is there who does not fail at times?) it is no warrant to carp and sneer at the very existence of the grand style and manner.

On the one hand, those who, whilst professing adherence to the Renaissance style of design, sneer at that which has the free and natural as its impulse, have not learnt either classic or Renaissance at all. This is an axiom which works out to the same result if applied the other way about, and which means that those who think they have caught the spirit of that which is spontaneous and fresh, and yet sneer at the scholarly methods of ordered design, have neither imbibed the one nor the other.

Nature is the boundless and unending mine of wealth from whence all the resources of art are drawn, and in garden design we are in the domain of art at once; it is only a question of the extent of orderliness we are to admit. If gardening and garden design are not thus to be classified, then we must dump our mansion down like Thoreau's Walden shanty, and if we imitate Thoreau our minds and thoughts become our garden of cultivation, and a very beautiful garden it becomes too; but Thoreau's mind-gardening is not the profusion of the wild tangle of disarray in which he lived. I noticed the same in Lord Rosebery's gardening speech the other day at Cramond Flower Show, near Dalmeny. He playfully confessed that he was not born with the gifts that make a gardener, professing to be ignorant of flowers and horticulture generally, yet in spite of this little disguise he presently went on to show that side of his character which marks him out as a great gardener born, for with a few clever strokes he disentangled from all wherewith it is nowadays confused, the true spirit of gardening. It would not be difficult to assign Lord Rosebery his proper niche in the temple of Renaissance design. He would not make a hybridizer, for such who delight in raising curious and diverse plants are those who produce the material wherewith gardens are embellished. "He is a gardener in taste, in sentiment, and appreciation," says a critic. Man as a race is gardener born ; he cannot help himself. From Adam onwards, if in outward bravado he makes a show of scorn of all order and discipline within the garden, or if like the noble lord who was the founder of our canal system, and in his professed subordination of everything to utility, he takes his cane and switches off the heads of the flowers, saying contemptuously, What care I for these gaudy trifles ? the garden instinct will have its revenge. In many parts of the country his canals are about as picturesque as they are useful, and their wealth of flowers in many counties where the meadows dip into them and fringe them is phenomenal. Mankind, I say, is gardener born ; we cannot help ourselves. We always fall into classification and arrangements and the study as to the sources of things. I do not care if we are only collectors of brass buttons, this principle holds good and we cannot escape from it.

I say, again, I agree with every gardener that the drilling system and classification may be carried too far ; this is the faculty of art, namely, to conceal and tone down any tendency to stiffness and angularity.

Yet, nevertheless, I would have you remember, good friend, that selectiveness and marshalling of trees and plants after a certain order is what you yourself are engaged in doing during most, if not all, the months of the year. If you have a conservatory you stage the plants and flowers for effect, so it is exactly in the borders and in the shrubberies, and you even try and help Nature sometimes in the woodland effects. Whenever you prune or tie up trees and plants, graft or hybridize, the same process of selectiveness and restraint is being exercised ; and, as we all know, many hybrids get sometimes a Royal Horticultural Society's medal ere we discover that they have not the vigour and hardiness to fill their position.

It is from the monks and the monasteries that our national traditions of gardening are obtained, and they, as we know, were perfect geniuses in the arts of classification. Is it not said of Adam that one part of his occupation in Eden was to keep it in order ?

There are certain shrubs, flowers, and trees which become a Renaissance garden, such as the rose, the lily, and possibly the carnation, because they have a certain classic pose and expression. They are the stately standards of refinement. In one or two of the choicest of the Italian gardens there is nothing else in the way of flowers but the rose, the lily, and the geranium, which is there not such a groundling as ours out of doors, and the shrubs are almost exclusively the box and the cypress, orange and myrtle, with infusions of the stately stone pine. Occasionally a deciduous tree and a few of distinctive or variegated foliage are inserted very sparingly, and there is no lack of variety with their coupled shafts, their stately architectural rest-houses, with cool colonnades and fountains.

The adornment of a Renaissance garden becomes the style more reserved and sparing than in the landscape style common with us; there are certain deciduous, as well as evergreen trees and shrubs, which especially grace it. The oak when well grown, the elm, and particularly the Wheatly elm on account of its erect growth, the Lombardy poplar used sparingly, the evergreen oak, the common and Irish yew and box, and particularly the cedar of Lebanon, the cypress family and the Scots fir, and more especially the stone pine, where it flourishes. The clean, stately trunks of the latter and the rich colouring of the branches are a complement to the stone columnar groups.

Our English examples of Renaissance garden design are so well known and the views of them are abundant, such as Chatsworth, Melbourne, Blenheim, Castle Ashby, Trentham, Brockenhurst Park, Harewood House, &c., but we are not so familiar with modern American Renaissance designs, and I fear we often greatly misjudge our American cousins. Although, as becomes a democratic Government, there is much of what happened in the days of the Judges—every man doing what is right in his own eyes—and it is the seed-bed from whence come all the sports, vagaries, and startling surprises, yet they are on the whole a people who incline to solid and traditional lines, and their gardens lean towards the solid dignity and repose of the best features of the Renaissance.

I read a letter the other day which shows to what a pitch vulgarity descends when men follow their own novelties undisciplined and what silly lengths it leads them to, and it serves to show that the rule of order and discipline always comes out at the top; after all, our extravagancies and novelties produce in the end the longing desire for Renaissance order and sanity. This is the letter:

"Here in America is the home of the grotesque as well as of the picturesque. Aristocracy and democracy jostle each other, and aristocracy gets the worst of it. We had a boiler explosion here lately, and among the emblems sent to the victims' funeral was a floral clock set for the hour of the explosion; a theatrical treasurer's club sent a floral pass, 'Admit one.' Gates ajar, open windows with plaster doves thereon, and tawdry wire frames showing through pillars of red and yellow flowers, all tend to vulgarize funerals and to inspire the words 'No flowers.' When the city council is inaugurated then are the florists busy. Gigantic keys, Indian clubs, desks, chairs, all are in hand; the natural flowers distorted to suit perverted tastes. *We need a Renaissance in art to strike the florists here, and strike them hard.*"

A study of the Renaissance in garden design in America shows how in the end if you give mere novelty rope enough it will eventually hang itself, and that which has law and order in the end prevails. Mankind as a race is orderly, and the more the individual has to do with business or with government, or with any stable pursuit which can be named, the more does he incline towards the stable and the established, the balanced and the orderly.

REMARKABLE INSTANCES OF PLANT DISPERSION.

By Rev. Professor G. Henslow, M.A., V.M.H.

[Read October 26, 1909.]

It is a well-known fact that some plants are very widely dispersed, not only in a particular and more or less circumscribed locality, but sometimes over a continent, or, indeed, over the whole world, except where extremes of climate forbid their presence.

The question arises, What are the peculiarities of such "cosmopolitan" plants that enable them to thrive and multiply enormously in a vast number of places?

There are two methods of multiplication: (1) the vegetative, by means of the roots, stems, bulbs, &c.; and (2) the sexual, or by fruits and seeds.

By the former method, in the case of runners and suckers, the area colonized by an individual plant is comparatively limited. If it be a water plant, and if the stem can break up into joints, then the stream will carry them along, so that they may strike root at various places. By such means *Elodea canadensis* has become widely dispersed through the British Isles since 1836, when it was presumably first and accidentally introduced with timber. Only the female plant is here known, except in one or two spots.

The best illustration known to me of great multiplication and wide dispersion by bulbs is to be seen in the northern distribution of *Oxalis cernua*, Thunb.[*] This plant is a native of the Cape of Good Hope, and has often been described by botanists who have studied the Cape flora.[†] It has become distributed not only on the islands of the Atlantic, as the Bermudas, Canaries, and Madeira, but along both the north and south coasts of the Mediterranean Sea. At the present day it is found in various places, from Egypt to Morocco, and from Gibraltar to the Greek islands. How did it come to be so widely distributed throughout the Mediterranean region?

No botanical author previous to the last century ever refers to it as growing in the northern hemisphere. The first to allude to it is Father F. C. Giacinto, who mentions the plant as being cultivated in the Botanic Garden at Valletta, Malta, in the year 1806. The title of his work is "Index Plantarum Horti Botanici Melitensis, anno 1806.—P. F. Carolus Hyacinthus."[‡]

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[*] Thunberg, *Diss.* No. 12, t. 2, f. 2 (1794).

[†] *E.g.* Harvey and Sonder, *Flora Capensis*, i. 348; and Thunb. *Fl. Cap.* ed. Schult. 537 (1825). Schultes describes *Oxalis cernua* as flowering at the Cape in June and July. It has completely changed this habit in the north, as it is in full blossom all through the winter, from November to April.

[‡] A copy of this work is in the public library at Valletta; and I take this opportunity of thanking Dr. A. Caruana Gatto for kindly making researches for me among the publications therein contained.

The next in date to allude to it is Professor Viviani, who records it as growing in North Africa, viz. "in pratis Cyrenaicæ," in 1824, and named it *O. libyca.*

A. de Candolle says, on the authority of Kelaart ("Fl. Calp." 1846), that it was introduced into Gibraltar in 1826 ("Géographie Botanique," ii. p. 724); A. P. de Candolle makes no mention of it in his "Essai élémentaire de Géog. Bot.," in "Dict. des Sc. Nat.," vol. xviii. (1820), as occurring in S. Europe.

The next to notice it is Professor Ch. Stephanus Zerapha, a contemporary of Giacinto's in Malta, who published his "Floræ Melitensis Thesaurus" in 1827.

It appears to have probably arrived in Egypt about that time, as Youssouf Effendi * is known to have introduced the Mandarin orange from Malta about 1820. It only occurs, at the present time, in the orange-gardens of Cairo and Esneh.

The above facts would seem to hint at the probability of Malta having been the original source of its diffusion; and the following facts will, I think, establish it.

We have it on the authority of Zerapha that his contemporary, Dr. Giacinto, brought the plant, which is spoken of as having been cultivated in Malta in 1806, from the Cape of Good Hope, for the information of his pupils; and Maltese botanists of a later date attribute the spread of it over the island, at least, to this source. Thus J. C. Grech Delicata says of *Oxalis cernua*, the "Haxixa ta l'Englisi," or the "English weed," as the Maltese now call it, in his "Flora Melitensis," p. 8 (1853):—"In campis et agris ubique. Indigena facta ab anno 1811."

That the subsequent general diffusion has had its origin in Malta appears to be satisfactorily proved by the structure of the plant itself. This species of *Oxalis* is naturally trimorphic at the Cape, as dried specimens in the Herbaria at Kew and the Natural History Museum fully testify, examples of all three forms, as well as plants with half-ripe fruits, being preserved. On the other hand, it has never been known to bear fruit in the northern hemisphere; the flowers, with their pedicels, after expansion fall, leaving scars on the peduncle. Moreover, the short-styled form is the only one described as occurring anywhere around the Mediterranean, and I have satisfied myself by examination of many plants from all parts of the island that this is certainly the only one in Malta.

Professor Viviani thus describes it in his "Floræ Libycæ Specimen, sive plantarum enumeratio, Cyrenaicam, Pentapolim, Magnæ Syrteos desertum et regionem Tripolitanam incolentium":—"Oxalis libyca, in pratis Cyrenaicæ . . . Capsulam maturam non vidi." He gives a full description as well as a plate (No. XIII.). The double form also occurs, as it does in Malta and at the Cape, &c.

Of more modern writers, Moris, "Fl. Sard.," i. p. 363 (1837–1843), speaks of it as growing in Sardinia; and Munby mentions it as growing in Algeria in 1847.

Professor F. Parlatore (1848), in his "Flora Italiana," describes it as growing at Castagno, near Naples, in the greater part of Sicily, in Corsica and Malta, as well as in Zante, near Smyrna, in Egypt and Algeria. In his description he says:—"Stylis distinctis, fere horizontalibus, capsula . . . seminibus . . .," stating that he has never seen the fruit.

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* In 1891 an Egyptian was selling Mandarin oranges in Cairo under the name "Youssouf Effendi," which he was shouting in the streets.

Mr. John Ball described this species in 1878 under the name *O. sericea* ("Spicilegium Floræ Maroccanæ," "Journ. Linn. Soc.," Bot. vol. xvi. p. 388), and alludes to the three supposed species—*O. sericea*, L. fil., *O. cernua*, Thunb., and *O. compressa*, Jacq.—as being only one, inasmuch as these three are but the short-styled, mid-styled, and long-styled forms. Since he records the plant himself as *O. sericea*, this implies that it is the short-styled form which grows near the city of Tangier. This and the double form often occur there. Mr. Ball quotes the distribution given above, and adds:—"in insulis Canariensibus,* Madeira . . . in agro Tingitano et alibi in Africa boreali."

The last to allude to it, that I am aware of, are Ascherson and Schweinfurth. In the list of plants of "Middle North Africa" ("Kufra," p. 513, 1881), the former describes it as growing in Cyrenaica, and regards it as a remarkable fact in geographical botany that this species should have two sources, for he appears to regard it as indigenous.† In their "Illustration de la Flore d'Egypte" (1889), these joint authors simply record it as naturalized at Cairo and Esneh.

Having had an opportunity of examining *Oxalis cernua* in the Maltese Islands in 1890—as it is most abundant in Malta and Gozo, but does not occur in Salmone—and again in Egypt in 1891, since it flowers from November to April, I found, as stated, that the single form was invariably short-styled, the double form being common in Malta, but not nearly so abundant as the single. Neither kind bears any fruit either in Malta or Egypt as far as I could discover.

The last place where I have seen it is Cannes, in 1892. I am informed by Dr. Battersby, of that town, that it has apparently decreased of late years. A single plant in the garden of M. A. Constant at Golf Juan was accidentally introduced with some palms, but from what locality it was not known. It was the short-styled form, as usual. It is not mentioned in M. A. Risso's "Flore de Nice," 1844; but M. Ardoino, in his "Flore du Département des Alpes-Maritimes," 1879, says:—"Cette plante du Cap de Bonne-Espérance que j'avais souvent remarquée dans les sentiers pierreux autour de Monaco, et qui me paraissait échappée des jardins, vient d'être retrouvée à Menton, à Villefranche, à Nice et à Cannes. Elle est en train de se naturaliser chez nous."

In the Botanic Garden attached to the School of Medicine in Cairo, I found *Oxalis cernua* cultivated in a pot, and a stray plant was growing in the garden. These two plants, however, were the long-styled form, and not short-styled, as all those I found in the orange-gardens at Cairo proved to be, and were doubtless introduced from Malta. Hence it would seem that while one plant was originally introduced from the Cape into Malta about 1806, another has comparatively recently been introduced from the same source into Cairo, whether accidentally with Cape plants or intentionally the Director, the late Dr. E. Sickenburg, could not tell me.

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* It does not appear to have reached the Canaries before the year 1840, for it is not mentioned by Webb and Berthelot in their *Histoire Naturelle des Iles Canaries*. According to Lowe only the double form is found at Madeira (*Manual of the Flora of Madeira, &c.*, p. 100). The source of it in these islands was probably direct from the Cape of Good Hope itself, and quite independent of the Maltese origin.

In De Candolle's *Prodromus*, vol. i. p. 696, *Oxalis cernua* is described "stylis brevissimis," which seems to imply that this author also only knew of the short-styled form.

† "Das Vorkommen dieser Cappflanze, welche seit mehrern Decennien auf Culturboden des Mittelmeergebietes sich vielfach eingebürgert hat (ich sah sie in Sardinien, Unter- und selbst Oberägypten zu Esneh !!), an offenbar ursprünglichen Fundorten unsers Gebietes ist eine pflanzengeographisch sehr merkwürdige Thatsache, da derartige Uebereinstimmungen zwischen Nord- und Südafrika selten sind."

The conclusion, therefore, seems to be convincing that, as the same features, as far as botanists have recorded their observations, appear to be characteristic of all the plants growing throughout the Mediterranean region, they have all been derived from the original specimen first brought to Malta by Professor Giacinto at the beginning of last century.

That it should first reach the shores of Africa is only what would be expected, as the Maltese have long had communication in trade along the northern coasts.*

As the plant is never known to ripen its fruits in the northern hemisphere, though it does so at the Cape, where all three forms, as well as the "double" one, occur, it may be as well to describe the means by which its extraordinary multiplication takes place, for in Malta it is ubiquitous. It carpets the roadsides as well as all the exposed open ground around Valletta, and might be taken at a distance for turf. It insinuates itself between the loose stones of which all the walls in Malta are composed, and appears at the surface like a green fringe around each stone. It covers the tops of the walls in many places, as well as the lofty fortifications. It not only forms luxuriant borders to the fields, but invades the cultivated soil; so that when, as is too often the case, the weeds are not uprooted, a field will look as yellow as an English meadow with buttercups. It is propagated entirely by bulbs. If a large plant be dug up in January, growing, we will say, amongst loose stony débris, it will be found to possess a long tapering *stem*,† throwing off thread-like lateral roots, and bearing minute leaf-scales with small white bulbils at intervals, as well as several larger ones at the crown below the cluster of leaves. The fine thread-like rhizome extends downwards, sometimes to a depth of more than a foot, and proceeds from a bulb of the previous season, from which this vertical subterranean stem has grown upwards. This bulb has outer, brown scales. Sometimes there are two bulbs, connected by the stem, included within the scales. The bulb itself consists of very thick scales, one overlapping the other, a cross-section of a scale having a crescent shape. In many instances, when the plant grows as above, the stem proceeds further downwards like a thread; but after a certain distance it suddenly increases in diameter, forming a short rod-like structure (a water-storage organ) about $1\frac{1}{2}$ to 2 inches long, with a bulb at the end. This explains how it is enabled to reach great depths, from which new plants arise in a subsequent season. On the other hand, the great length of the subterranean stem explains how the plant is enabled, so to say, to "climb up" between the stones of the walls, thus accounting for the green fringe which is often seen all round the stones in the lower part of the walls in Malta.

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* The whole number of plants recorded by Ascherson in Tripoli and Cyrenaica is 917. Of these there are 217 wild plants in common with Malta.

† Not *root*, as described by Mr. Ball, *l.c.*

Besides the bulbs thus formed in a vertical line, at all depths, this Oxalis often produces runners above ground. They only occur, however, on luxuriant plants, such as those growing by the watercourse in the Wied Encita, or in the rubbly ground within the ditches of the fortifications, &c., or, again, in the rich soil of the orange-gardens at Cairo. The runners, however, do not root like those of strawberries, but produce bulbs at the nodes, so that a number of young plants can be produced at a short distance from the site of the parent plant.

It certainly affords one of the most extraordinary instances of a very extensive multiplication, and that solely by the vegetative system, indicating the fact that the assumption that intercrossing of flowers by fertilization is necessary to ensure vigour is totally unfounded.* It might be thought that, as it is only the short-styled form which exists, the pollen might readily fall upon and pollinate the stigmas, thus assuring at least self-fertilization. It undoubtedly does fall down upon them, as there are ten anthers well filled with pollen, which stand above the stigmas; but whether the latter be perfect or not has not been ascertained. At all events, seed is never set, so it is practically impotent.

The double form is very common, though not to the same extent, in Malta, and, as mentioned above, it occurs in N. Africa as well as in the Atlantic Islands. It often has rather smaller leaves, but I do not think this can be relied upon as a fixed character; the petals are sometimes more than fifty in number, and are orange-yellow, those of the ordinary form being golden yellow.

It may be added that the tendency to produce bulbs is to some extent dependent on the growth of the plant. The generally infertile calcareous ground of Malta, where it grows by the roadsides, &c., tends to induce the formation of bulbs, for they are much fewer on a plant which grows luxuriantly, when it spends its energies in the development of flowers and foliage. Thus, in the orange-gardens of Cairo it does not spread as in Malta, but the individual plants grow to a great size.

As an illustration of the production of bulbs under a check to vitality, I may add that when specimens are being pressed for a herbarium, a quantity of bulbs are always formed at the same time at the crown of the vertical rhizome; the vital energy, being checked above, now expends itself in the formatiou of bulbs until the whole plant is dead.

A final word on *Oxalis corniculata*, L. This species is very wide-spread, and botanists of the last century often allude to its extension in the Mediterranean regions. It is a native of Malta, but at the present time only to be found in gardens. It was the opinion of the late Dr. Gulia, Professor of Botany in the University of Malta, that *Oxalis cernua* had driven it away from the open ground. In Cairo, *O. corniculata* is abundant in the Esbekiyeh public gardens, where it occupies large patches in the "turf," the latter being principally composed of *Cyperus rotundus* and *Lippia nodiflora*, which it appears to displace. In the botanic garden at Cairo, the two species were actually growing intermixed as intruders in a border, and *O. cernua* was certainly overwhelming the *O. corniculata*.

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* Just as is the case with *Elodea canadensis* in this country.

The dispersion of by far the greater number of widely dispersed plants has been by fruits and seeds. It would be beyond my purpose to deal with many foreign plants, such as the cocoanut and *Ipomoca pes-pelicanis*, &c., of tropical shores, which have natural facilities for dispersion by ocean currents. But, confining our attention to British plants, we find, not only that many are widely scattered over our islands, but have spread, whenever accident has introduced them into the Colonies, with extraordinary vigour. I will now give some illustrations.

As remarkable instances of enormous areas now covered by introduced plants, Darwin thus speaks of South America:—"Near the Guardia we find the southern limit of two European plants, now become extraordinarily common. The fennel in great profusion covers the ditch-banks in the neighbourhood of Buenos Ayres, Monte Video, and other towns. But the cardoon (*Cynara Cardunculus*) has a far wider range: it occurs in these latitudes on both sides of the Cordillera, across the continent. I saw it in unfrequented spots in Chili, Entre Rios, and Banda Oriental. In the latter country alone, very many (probably several hundred) square miles are covered by one mass of these prickly plants and are impenetrable by man or beast. Over the undulating plains, where these great beds occur, nothing else can now live. Before their introduction, however, the surface must have supported, as in other parts, a rank herbage. I doubt whether any case is on record of an invasion on so grand a scale of one plant over the aborigines." Darwin then proceeds to show how precisely analogous results have followed in the animal world, by the introduction of the horse, cattle and sheep, of which "the countless herds not only have altered the whole aspect of the vegetation, but they have almost banished the guanaco, deer and ostrich. . . . While packs of wild dogs may be heard howling on the wooded banks of the less frequented streams, and the common cat, altered into a large and fierce animal, inhabits rocky hills." *

Speaking again of the "Thistles," Darwin when passing the small towns of Luxan and Areco says:—"The estancias (private estates) are here wide apart; for there is little good pasture, owing to the land being covered by beds either of an acrid clover, or of the great thistle. The latter were at this time of the year two-thirds grown; in some parts they were as high as the horse's back, but in others they had not yet sprung up. . . . When the thistles are full grown, the great beds are impenetrable, except by a few tracks, as intricate as those of a labyrinth. These are only known to the robbers, who at this season inhabit them, and sally forth at night to rob and cut throats with impunity. Upon asking at a house whether robbers were numerous, I was answered, 'The thistles are not up yet.'" †

Darwin adds a more interesting feature about the thistles near Mercedes on the Rio Negro:—"The geological nature of this part of the province was different from the rest, and closely resembled that of the Pampas. In consequence, there were immense beds of the thistles as well as of the cardoon. The two sorts grow separate, each plant in company with its own kind. The cardoon is as high as a horse's back, but the Pampas thistle is often higher than the crown of the rider's head."[*]

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* *Nat. Voyage, &c.*, p. 119.

† *Op. cit.* p. 124.

Mr. Darwin calls it a thistle as distinct from the cardoon; but neither Hooker nor Griesbach appears to recognize any species of *Carduus* or *Cnicus*. The latter botanist speaks only of the cardoon (*Cynara Cardunculus*), *Silybum*, *Lappa* (Burdock), and fennel; *Silybum Marianum*, known as the milk-thistle, is the only species of so-called "thistle" indigenous in the Mediterranean regions and further east. It is closely allied to *Carduus*, the true thistle, so that perhaps Darwin referred to this plant. It has white streaks on the ribs and veins of the leaves.

It is an interesting fact that with regard to the evident dispersion of our British plants, those which have travelled furthest and established themselves most thoroughly are self-fertilized plants, with the exception of a few anemophilous plants, as *Rumex crispus*, *Luzula campestris*, plantains, and a few grasses. In my essay on "The Self-fertilization of Plants"[†] I have enumerated about thirty natural orders which are represented in *at least*, but often many more than, *four* distinct localities. I will select a few familiar examples.

Capsella Bursa-pastoris (Shepherd's Purse).—Chili; New Z.; Trop. Asia; N.E. Afr.; S. Austr.; Hongk.; Jap.; Kamchat.

Stellaria media (Chickweed).—Auckland, Campbell, and Kerguelen Islands; New Z.; Trop. Asia; Madeira; S. Afr.; S. Amer.; S. Austr.; Hongk.; Jap.

Galium Aparine (Cleavers).—Chili; S. Austr.; Falkland and Luegia; New Z.; N.E. Afr.; Jap.; Madeira; Mexico.

Solanum nigrum (Black Nightshade).—S. Austr.; Tasm.; New Z.; N.E. Afr.; Society I.; Andaman I.; Hongk.; Jap.; Calif.; Galapagos I.

Polygonum aviculare (Knotgrass).—S. Austr.; New Z.; S. Afr.; S. Amer.; N.E. Afr.; N.E. Asia; Jap.

The above is but a sample; but the inference is conclusive that for securing the sole "end" of plant-life (that is, means of propagation whether by buds or seeds), self-fertilizing plants are much better favoured than those which are entirely or mostly intercrossed.[‡]

Examples of self- and wind-fertilized plants, acquiring great vigour when naturalized abroad, often replacing the native vegetation, are given in New Zealand. Mr. W. T. Locke Travers, writing to Sir J. D. Hooker from Canterbury in 1864, thus speaks of some of our British weeds:

"You would be surprised at the rapid spread of European and other foreign plants in this country. All along the sides of the main lines of road through the plains, the knotgrass (*Polygonum aviculare*) grows most luxuriantly, the roots sometimes two feet in length, and the plants spreading over an area from four to five feet in diameter. The dock (*Rumex crispus*) is to be found in every river bed, extending into the valleys of the mountain rivers until these become mere torrents. The sowthistle is spread all over the country, growing luxuriantly nearly up to 6,000 feet. A watercress (*Nasturtium amphibium*) increases in our still rivers to such an extent as to threaten to choke them altogether; in fact, in the Avon, a still deep stream running through Christchurch, the annual cost of keeping the river free for boat navigation and for purposes of drainage exceeds £300. I have measured stems twelve feet long and three quarters of an inch in diameter. In some of the mountain districts, where the soil is loose, the white clover is completely displacing the native grasses, forming a close sward." *

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[*] *Nat. Voyage*, &c., p. 148.

[†] *Trans. Linn. Soc.* 1877.

[‡] The reader will find this contention fully established in the paper alluded to. Darwin's original statement that "Nature abhors self-fertilization" was based upon his study of relatively large and conspicuous flowers; but insignificant blossoms of "weeds" and their profuse multiplication proves the above to have been a mistake, which indeed Darwin subsequently acknowledged.

Mr. Darrens observed that the white clover spread over tracts of peaty soil, which until invaded supported a dense and luxuriant growth of the New Zealand flax (*Phormium tenax*); but one of the greatest pests was *Rumex Acetosella*, the sheep's sorrel; this, however, was expelled by the white clover. The latter, notwithstanding its extraordinary vigour, was itself unable to hold its own against the cat's-ear (*Hypochaeris radicata*) or some similar composite, introduced with grass-seeds from England. In Nelson excellent pastures were wholly destroyed in less than three years by this weed, which absolutely displaced *every other plant on the ground*. Lastly "the dock, the sowthistle and other European composites, the red sorrel, &c., were to be met with all over the country." To this the following testimony has been added. "The most remarkable special instance of all that have been communicated to me," wrote Sir J. D. Hooker, "is, that the little white clover and other herbs are actually strangling and killing outright the New Zealand flax (*Phormium tenax*), a plant of the coarsest, hardest and toughest description, that forms huge matted patches of woody rhizomes, which send up tufts of sword-like leaves, six to ten feet high, and inconceivably strong in texture and fibre. I know of no English plant to which the New Zealand flax can be likened so as to give an idea of its robust constitution and habit to those who do not know it. (The garden *Yucca* resembles it somewhat.) It is difficult enough to imagine the possibility of white clover invading our bogs and smothering the trussocks of our *Carex paniculata*, but it would be child's play in comparison with the resistance the *Phormium* would seem to offer."

The preceding facts show an extraordinary amount of vigour in *Trifolium repens*, the Dutch or white clover. Darwin's experiments showed that if protected it only produced 10 per cent. of the quantity of unprotected and visited by bees; in another it bore no good seed at all, while twenty unprotected had 2,290 seeds. Hence this plant is extremely self-sterile. Whether it acquired self-fertility in New Zealand and America, where it is equally thriving, is not known; but it affords a good instance, if it requires insect aid, of "an exception which proves the rule"; for it rivals the knotgrass, and the ligulate composite, whatever it was, which are both self-fertilizing (if the latter behaves like the dandelion). "The causes of this prepotency of the European weeds are probably many and complicated; one very powerful one is the nature of the New Zealand climate, which favours the duration of life in individuals, and hence gives both perennials and annuals a lengthened growing season; and, in the case of some species, more than one seed crop is borne in the year. This is seen in the tendency of mignonette and annual stocks to become biennial and some perennial, in the indigenous form of *Cardamine hirsuta* being perennial, and in the fact that many weeds that seed but once with us, seed during a greater part of the year in New Zealand.

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* Quoted by Hooker in the *Nat. Hist. Rev.* 1864, p. 124; and in *Pop. Sci. Rev.*, vi. p. 137.

Another cause must be sought in the fact that more of their seeds escape the ravages of birds and insects in New Zealand than in England, the granivorous birds and insects that follow cultivation not having been transported to the Antipodes with the weeds, or, at least, not in proportionate numbers.

"Still the fact remains as yet unaccounted for, that annual weeds, which, except for the interference of man, would with us have no chance in the struggle with perennials, in New Zealand have spread in inconceivable quantities into the wildest glens, long before either white men or even their cattle and flocks penetrate their recesses." *

The latest instance recorded of a similar destruction by an intruder is the following extract from the "Daily Telegraph" (1909):—"Great mischief is being wrought in Queensland by the prickly pear. In his recent tour in the country to the north-west of Brisbane, the Minister for Lands was appealed to by new settlers to defer payments during the early years of settlement, as they have to wage a strenuous fight against the pest. Mr. Denham states that there are men in the Taroom district who remember when the only clump of pear in the countryside was in a garden at Rockdale. To-day there are thousands of acres of the plant, and in some places roads are so hemmed in as to make the crossing of vehicles difficult. The Minister severely condemns lessees who have, by their indifference, practically watched the ruin of their holdings. A few early steps would have saved thousands of acres now lost to cultivation. Loose views on the part of settlers in regard to their responsibilities as Crown tenants, and the holding of too much country, are conditions which have favoured the pear's spread. Mr. Denham is of opinion that closer settlement is now the only remedy, but this is impossible without railway communication. Unless something is done speedily, large areas of fertile country will be lost to the State.

Of foreign plants more or less widely distributed over the British Isles the following may be mentioned:—

Lepidium Draba (Whitlow Pepper-Wort).—This is said to be abundant in the Caspian region. I have found it in Malta, and it is believed to have been introduced after the unfortunate Walcheren expedition in 1809, when Lord Chatham landed at Veere and took Middelburg and Flushing, but had to retire, having lost 7,000 men by fever. It has now spread over the south and midland counties.

Senebiera didyma.—A native of temperate South America. Hooker says of it, "Waste ground from Fife southwards; S. and W. Ireland." It has of late years become very abundant in the Channel Islands.

Galinsoga parviflora.—A native of Central and S. America, first noticed in Europe about a century ago; but is now abundant, especially in Surrey and Middlesex.

Erigeron canadense.—"This N. American plant has spread over all the temperate regions of the world. It was noticed in France in the seventeenth century, and a few years later in England. It is commoner in Southern counties." *

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* "On the Struggle for Existence amongst Plants," *Popular Science Review*, vol. vi. p. 138.

Gnaphalium luteo-album.—This occurs in Norfolk, Suffolk and Sussex, Jersey, and all warm countries. In the Southern hemisphere it has been found in S. Australia, Tasmania, New Zealand, Falkland and Luegia, N.E. Africa, Norfolk Island, Madeira, California, Auckland. The stigmas do not protrude but receive the pollen, as in groundsel, from the anthers *within* the anther-cylinder.

Impatiens fulva.—This North American plant has become naturalized by river-sides in Surrey, Wilts, &c. It was introduced about 60 years ago.

Oxalis corniculata.—Ubiquitous, except in very cold countries; possibly indigenous in S.W. England, not north of it (Hooker); formerly abundant in Malta, but has been displaced by *O. cernua*, being now only found in gardens. It is common in Jersey.

Mimulus luteus.—Native of W. North America; not uncommon by river-sides from Skye southwards; it is "thoroughly established in many places in Worcestershire."

Linaria Cymbalaria (Ivyleaved Toad-flax).—This is now common on old walls, &c. It is thought to have escaped from the Chelsea Botanic Garden, where it was first grown.

Centranthus ruber (Red Spur Valerian).—A native of S. Europe and now thoroughly established, especially in S. England.

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* Amphlett and Rea's *Botany of Worcestershire*, p. 194.

SOME BEAUTIFUL SHRUBS.

By E. Beckett, V.M.H.

[Read November 9, 1909.]

It was with a keen sense of pleasure, though not without some anxiety, that I accepted the Secretary's invitation to speak upon the subject of "Flowering Shrubs"; for although it has been my good fortune to be engaged in many branches of horticulture, I have no hesitation in saying that in none have I found greater interest or derived more pleasure than in flowering shrubs. It may be well to say at once that all the statements I shall make are the outcome of practical experience and painstaking observation. I have been engaged with my esteemed employer, the Hon. V. Gibbs, whose knowledge of shrubs is very great, in collecting and growing flowering shrubs from many parts of the world for more than a quarter of a century, and may therefore claim to know something of their requirements and to be able to form an opinion as to which are the most suitable for our climate.

During the last few years hardy shrubs have claimed the attention of many garden lovers, and, indeed, all branches of horticulture which are dealt with out of doors have benefited greatly by the much increased interest taken in them. The enthusiasm now so noticeable among those who concern themselves with flowering shrubs is due to a variety of causes, one of the principal being that they require a much smaller amount of attention than do plants cultivated under glass, and this is important to those who are unable to devote a large amount of time to their gardens. Another reason may be that there is a much greater element of permanence, and a nearer approach to a natural condition of things, in "open air" than in "hot-house" gardening: if the expenditure required for proper upkeep were suddenly to stop, the first hard frost would wipe out everything in the house, as if they had never been; but in the open there might be found some rare trees or shrubs flourishing a hundred years after the last penny had been spent upon them.

Further, it may be urged that by judicious selection one can have some shrub or shrubs in flower all the year round; and, again, the material at command is so large that varieties suitable for any soil or situation may easily be secured. Another and perhaps the paramount reason for their leap into popularity is owing to the immense number of beautiful shrubs which have been introduced into cultivation by that clever and indefatigable collector, Mr. E. H. Wilson, through the instrumentality, in the first place, of Messrs. Veitch, and more recently of Professor Sargent, of the Arnold Arboretum; and though many of these have not been long enough in the British Isles to establish their adaptability, we may safely assume that a large number will prove to be beautiful and valuable additions.

It is but a decade or two since the occupants of our shrubberies and ornamental grounds consisted chiefly of such evergreens as the holly, yew, laurel and privet, together with a certain number of conifers, possibly not all very appropriate to the locality nor well suited to the climate.

Both evergreens and conifers are beautiful and necessary, but they should never be so largely employed as to make it practically impossible to utilize deciduous shrubs and trees, for it is widely recognized that the most pleasing results are obtained from the latter. I do not for one moment wish to depreciate the value of conifers and the like, as I know their worth if planted with discrimination, but it is indisputable that to produce the most satisfactory results both broad-leaved and narrow-leaved trees, evergreen and deciduous, must be blended. I desire to-day to urge a more extended use of deciduous shrubs, for the host of material at our disposal renders the beautifying of our gardens at all seasons an easy matter, and this applies particularly to the winter and early spring months, with which I hope to deal more fully later on.

It is not possible in one lecture to deal exhaustively with all that appertains to flowering shrubs and their successful culture, but I hope to touch upon some of the more important points, and, while not attempting a regular catalogue, to enumerate many of the most effective and desirable of them for general use in gardens.

PLANTING.

Success or failure depends so largely upon how and when flowering shrubs are planted that my experience in respect to this may be of value to some. Although "how" and "when" are to be regarded as of paramount importance, it must of course be understood that the weather following the operation, and differences of locality and soil, are all factors to be considered; but as nearly all the shrubs I shall mention belong to the deciduous section, planting may be safely accomplished at the times mentioned later in this paper. The first necessity is that the ground should be well drained, for very few shrubs will succeed where the soil is water-logged; then it should be thoroughly broken up to a depth of at least 2 feet, and if very heavy in character some suitable lightening material should be incorporated, nothing being better for this purpose than well decayed leaf-mould and coarse road sand. On the other hand, should it be light in texture, a good heavy loam is the most desirable addition. All ornamental shrubs will succeed either in loamy or peaty soil, and it is quite unnecessary to prepare elaborate mixtures for their reception. The trenching in of manure is not desirable, unless the ground is deeply worked and the manure is placed right at the bottom, for young roots are injured by coming in contact with manure at an early period after planting and before a healthy natural action in them is established.

Deciduous shrubs may be planted at any time from the fall of the leaf till the buds burst in spring, except when the ground is in a frozen condition or in a cold or wet state, but I am well aware that planting often has to be done at the most convenient time. If I could foresee that we should have a mild, open winter, followed by a dry spring, I would certainly plant at the earliest possible moment in the autumn; but, on the other hand, if I were sure that we should experience a hard winter, followed by a genial spring, I would defer the planting till then. The ground should be prepared some time before it is intended to plant, and the place for each shrub marked by a stake or label, so that no delay may occur when the plants arrive. In planting a shrub, a hole should be taken out of sufficient size to comfortably admit all the roots; any broken or damaged pieces should be pruned back on the under side, but care should be taken to retain all the fibrous roots possible, as on these depend the life of the plant. Spread all the roots out evenly, and begin to fill in, by working the finest soil round the roots first, pressing firmly as the work proceeds, but never make the soil so hard that water cannot pass freely through. Some difference of opinion exists as to the depth a shrub should be planted, but it is certain that this should never be done deeply. If the roots are near the surface, they quickly emit new rootlets, owing to the greater warmth, but if buried some distance beneath the surface, where the heat of the sun cannot reach them, they make but slow progress, and there is a danger of the soil becoming sour if active growth does not soon begin. Certainly, in a heavy soil, it is a less fault to plant a tree or shrub too high than it is to bury part of the stem. If the planting is done in the spring and a warm dry spell follows, a mulching of long litter, decayed leaves, or old soil is of great assistance and frequently saves the life of a shrub at a critical period. If a mulching is given it keeps the soil underneath moist, and no watering is necessary, as the roots are not in a condition to take up a lot of moisture, a spraying over the branches being far more effective.

In the case of standard shrubs a support should be given, so that they are not disturbed by the wind, but the stake must not be driven in so near to the stem as to injure any large roots. Care must also be taken not to secure the stem too tightly to its support, for if this is done with string much harm may follow when the bark begins to swell. Shrubs are often injured, or even killed, by having string tightly bound round them.

The preparation of the ground for Ericaceous plants where they do not thrive naturally needs special attention, and, as everyone knows, these will not succeed where lime is abundant in the soil. If the soil is uncongenial, it should be taken out to a good depth, and a mixture of peat, sand, and decayed leaf-mould substituted if possible; but this is not always available, and many plants of this class will grow equally well in turfy loam, with a good proportion of decayed leaves and sand. Many rhododendrons, of the Ponticum section especially, will flourish in heavy loam or even clay, providing it is well broken up beforehand, so that the absence of peat in the soil need not deter anyone from using many beautiful Ericaceous plants.

PRUNING.

Although this is a most important part of the cultivation of flowering shrubs, and affects them just as much as good or bad pruning affects a fruit tree, it is, generally speaking, but imperfectly understood, and much more harm than good is often done by the indiscriminate use of the pruning knife. It is a question whether it is not better to leave flowering shrubs entirely unpruned than to cut them over in a haphazard manner, for by so doing the flower crop is frequently lost, and the appearance of a shrub, which in its natural state is elegant and beautiful, is quite destroyed. The objects of pruning should be to keep a shrub shapely, and by thinning out unnecessary or old wood to produce a freer growth and a larger amount of flower.

No hard and fast rules can be laid down, for some shrubs require no pruning at all, while others are improved and stimulated by the process. Each individual shrub must be treated according to its requirements, and these can be learned only by practical experience and observation of the plants that have to be dealt with. Newly planted shrubs are often greatly benefited by being severely pruned immediately after planting, and this is especially the case with those whose stems die back after transplanting and refuse to break freely.

Shrubs which flower during the spring and early summer months are, of course, very numerous, the majority coming into bloom between April and June. All the pruning these require should be done as soon as the blossoms have fallen, as then the growths subsequently made will have an opportunity to become ripened. The cutting out of stems which have flowered is often preferable to merely shortening them back, and this is especially the case with the Deutzias, Weigelas, Philadelphus, and the like. Others, of which the Syringas are notable examples, are better if shortened back when the summer growth is completed.

Shrubs which naturally have a straggling habit often need pruning back every year to keep them shapely and in place. Many subjects respond well to this treatment, especially when they become old and apparently worn out, and will frequently be rejuvenated by the operation. The Weigelas and Ribes are particularly good examples of this. On the other hand, it must be remembered that some can only be pruned in a young state, the Cytisus for instance, for these refuse to send forth new growth if the very old wood is cut into.

Tender shrubs should never be pruned in late autumn, rather wait until growth begins in the spring.

As I have previously said, pruning can only be learned by observation, but a knowledge of how and what to prune can soon be acquired by those who take an intelligent interest in flowering shrubs, though they would learn more from seeing one or two operations properly performed than from reading pages upon the subject.

Some Beautiful Shrubs.

In choosing beautiful shrubs, suitable for gardens of all sizes, I have included some which, though they may not be remarkable for the beauty of their flowers, are desirable and worthy of inclusion on account of their ornamental foliage, a point which is often overlooked when shrubberies are being planted. It is well to remember that the majority of shrubs flower in the spring and early summer months, and when that date is passed there comes a time when the value of beautiful leafage, whether it be green or otherwise coloured, is fully appreciated.

Brightly coloured foliage needs to be used with discretion ; and while a few plants with purple, golden, or silvery foliage, used occasionally, give a pleasing effect, their too frequent use, or their use too close to one another, will produce a garish and vulgar result. This one often sees with the golden privet, *Prunus Pissardi*, or some other shrub which has taken a sudden leap into popularity.

Groups of one variety of coloured foliage, of course, produce excellent and striking effects if used judiciously and one has the space at command to do them justice, and their value becomes more apparent when seen in quantity. The most beautiful of all shrubs with variously coloured leafage are undoubtedly the Japanese maples, forms of *Acer palmatum* and *A. japonicum*, and it is often a matter of surprise to me that they are not more generally cultivated. They are quite hardy, of easy cultivation, and the foliage possesses a great variety of form and colour. Many have exquisitely coloured leaves in the young state, and in autumn the varieties of *A. japonicum* are particularly gorgeous.

Some of the most desirable forms of *A. palmatum* are *atropurpureum*, *sanguineum*, *corallinum*, *septemlobum* and its two forms *elegans* and *elegans purpureum*, *linearilobum* and its forms *linearilobum atropurpureum* and *palmatifidum*.

Acer japonicum has large ornamental foliage, and the varieties *aureum* and *laciniatum* should also be included.

Interspersed among the other occupants of the shrubbery, or given a bed to themselves, where the various forms and colours produce such a pleasing contrast, these maples are wonderfully attractive, and add a peculiar interest and beauty to the garden, unsurpassed by any other shrubs. If given a well-drained, not too heavy, soil (from which lime is absent) and sheltered from east winds, but fully exposed to the sunlight, they soon become established and able to take care of themselves.

Many other members of this large family, which has been augmented during the last few years by new introductions from China, are quite as deserving of a place in the ornamental shrubbery as the forms of *A. palmatum*, and will undoubtedly become popular with all who can appreciate delicacy of form and brilliancy of colouring.

The most admired of very early flowering shrubs, whose flowers appear before the leaves, are unquestionably the wych hazels, of which *Hamamelis mollis* is the most striking. The peculiar flowers of a bright yellow colour are produced very freely and the foliage is quite striking, being of large size and clothed on the under surface with dense tomentum. *H. japonica*, its variety *Zuccariniana*, and *H. arborea* should also be grown, but the American wych hazel, *H. virginica*, does not appear to be either so showy or so satisfactory in this country as the Japanese species. These shrubs succeed best in a good heavy loam, and resent disturbance at the roots after becoming established.

Somewhat similar in character and botanically allied, but smaller and more sensitive to a very low temperature, are *Corylopsis spicata* and *C. pauciflora*, of which the former is both better known and more ornamental. These flower freely when well established.

Another relative of the foregoing, *Cercidiphyllum japonicum*, makes a large shrub in this country, and its richly coloured young foliage, of a tender rosy amber, is very pleasing. The profusion of red stamens in the male flowers, which appear before the leaves, is also attractive. *Disanthus cercidifolia*, which is at present very scarce, has foliage resembling *Cercidiphyllum*, but the habit is less columnar. It is also a member of the Hamamelidaceae, but I have not seen the flowers yet. It is, however, very desirable, on account of the brillant colour of the foliage in autumn.

The species of *Cercis* have much to recommend them as small trees or bushes either in the shrubbery or as isolated specimens, and are deserving of more extended use. They are not partial to the full glare of the sun, and I learn from Mr. Gibbs that on the Continent they are nearly always used for under-planting among other trees of more robust type. The flowers appear before the leaves, and are produced very freely, both on young and old wood, and none of them require pruning. The one most frequently seen is the Judas tree, *Cercis siliquastrum*, which has reddish-purple flowers; but others worthy of inclusion are *C. canadensis*, the Red Bud of North America, which is more slender in growth and with smaller flowers, and the very excellent pure white form of this.

Perhaps the best known of all early flowering shrubs are the Forsythias, and there is no doubt that they merit a place in all gardens. They seldom, if ever, fail to produce a wealth of blossom, and the brilliant yellow colouring of the flowers is most welcome in the springtime. *Forsythia suspensa* is undoubtedly the most handsome, and of this there appear to be two or three varieties. Some prefer to give them specific rank, but it appears to me that they are only forms of the type which differ slightly in habit or the colour of the flowers. *F. viridissima*, which makes a rotund bush of somewhat slower growth, is a little later than *suspensa* and quite as handsome in its bloom, but stiffer and less graceful in its habit; while there is also *F. europaea*, a new species from Albania, in which I can see but little merit. It is, of course, interesting geographically, but seems to me quite out-classed by the Chinese forms.

Cydonia, better known as *Pyrus*, *japonica* is generally appreciated whether as a bush or wall plant, and few shrubs are more attractive in spring. As an isolated specimen in grass this shrub attains to a large size, and a specimen at Aldenham, now seventy feet in circumference and just about the same number of years old, makes a brilliant display with its bright red flowers. There are several excellent varieties, of which *Simonii*, with rich purplish-red flowers, is perhaps the finest of all. Of the others *Mallardii*, pure white; 'Knap Hill Scarlet,' a very large single blossom; *cardinalis*, very bright in colour; and *Gaujardii*, with white and red blossoms, are the most attractive. Another Japanese species, *Cydonia Maulei*, with orange-red flowers, is a very pleasing small bush, and produces its flowers with remarkable freedom. It also fruits freely, the fruits being yellowish in colour and deliciously scented. Excellent varieties of this type are: *alba*, *atrosanguinea*, and *superba*, the last having especially rich-coloured flowers. The Cydonias require practically no pruning, but as the varieties are generally worked on the typical form no dependence can be placed on the colour of the blooms which plants grown from seed may produce, and, just as in the case of tree-paeonies, lilacs, &c., it is important to see that suckers are not allowed to develop, to the injury of the parent plant.

The Myricas are not so frequently seen as they deserve, for, though they cannot be called brilliant flowering shrubs, their delicious fragrance should always ensure them a place. The sweet gale, *Myrica Gale*, has a profusion of golden brown flowers, borne in catkins before the foliage, which emit quantities of aromatic pollen grains. It is a good shrub for planting in a moist situation. *Myrica carolinensis* and *M. cerifera* are also worthy of inclusion. *Myrica* (or *Comptonia*) *asplenifolia* has extremely pretty finely-cut, sweetly-scented foliage.

One of the handsomest of all early summer-flowering shrubs is *Exochorda grandiflora*, a near relative of the Spiraeas, commonly known as the pearl bush. It comes from China, and makes a bush ten feet or more in height, and as far through. It requires a sunny position to well ripen the wood, and as a single specimen or massed in quantity makes a very showy display of pure white flowers. *E. Albertii*, a species from Turkestan, seems decidedly less floriferous than its Chinese relative, and I have never yet seen it flower freely.

Chimonanthus fragrans is well known as the winter-sweet, and is frequently seen on walls. It also makes a suitable plant for the shrubbery, but to ensure a good display of blossoms, which appear before the foliage, the summer growth must be well matured. *C. fragrans grandiflora* is to my mind much the more desirable variety to grow.

Several of the willows are decidedly ornamental in spring, with their profusion of catkins, but the most attractive species with which I am acquainted is *Salix gracilistyla* from Japan. It is perhaps most effective when grafted on to a standard of good height so that the branches are able to show their pendulous habit to advantage. The catkins are grey on first appearing, and later become suffused with red, which gives them a pleasing and unique appearance.

A very beautiful shrub, also from Japan, but little known in this country, is *Symplocos crataegoides*, which makes a bush about ten feet in height, and early in June produces a wonderful profusion of pure white flowers just as the leaves are appearing. They are sweetly scented, and are succeeded in the autumn by large quantities of pale blue berries, which render the plant very attractive. This uncommon shrub deserves to be largely cultivated, as it is perfectly hardy and unlike anything else we have.

We may now pass to those deservedly admired plants the Magnolias, several of which are well known for the large blossoms which they produce early in the spring, and which, when not damaged by frost, are among the foremost of flowering shrubs. The most desirable of the small and medium growing kinds to cultivate are *M. stellata*, with starry white flowers, and its rose-coloured variety; *M. conspicua*, large pure white; *M. Soulangeana*, white flushed with rosy purple; *M. parviflora*, with pure white flowers and a profusion of showy red anthers; *M. obovata*, with deep purplish red flowers, which are seldom injured by spring frosts, as they are produced later than the preceding sorts. Among the larger growing kinds some of the most desirable are *M. grandiflora*, a fine evergreen species with very large white flowers, but in the colder districts requiring the protection of a wall; *M. tripetala*, with white flowers and very large foliage; and *M. macrophylla*, one of the most imposing of the group, with immense foliage and flowers pure white in colour. It should have a position sheltered from rough winds, which are apt to lacerate the foliage. The Magnolias are not fastidious as to soil, though a good heavy loam suits them best, and when planting they should be placed in the permanent position, as they resent disturbance at the roots. The Tulip Tree, which is a near relation of the Magnolias, has the same objection to transplantation. *M. conspicua* and *obovata* I have found transplant better than the others when of small or medium size.

Xanthoceras sorbifolia (fig. 123) is one of our most charming early flowering shrubs, but it is not so frequently met with as one would expect. A warm position should be chosen for it, and a rich deep loam is the best soil. The flowers, which are white with a red blotch at the base of each petal, somewhat recalling those of the horse-chestnut, are produced in quantity just as the leaves are appearing, and it makes a very handsome bush ten feet in height. The fruits are large and green looking externally, like walnuts, and sometimes appear when the plant is still in its infancy.

The *Spiraea* genus contributes to our gardens an immense number of beautiful flowering shrubs, some of which flower early in the spring, while others do not blossom till the end of summer, so that it is possible to have some of them in flower from March till October. Many of them make excellent specimens, while others are specially well adapted for planting in masses, and make fine groups of colour in the woodland or semi-wild garden where sufficient space is available.

There are a great many species and varieties and innumerable hybrids, but few of the latter are of special note, and I propose giving a selection only of the choicest. *S. Thunbergii* and *S. arguta* are two of the earliest to flower, both with pure white flowers in such quantity as almost to hide the slender branches. *S. prunifolia fl. pl.* flowers in April, and is one of the finest for planting in a group, as the autumn foliage is of a very gorgeous deep red. *S. japonica* is a summer-flowering species, red in colour, of which there are several excellent varieties. The best is named 'Anthony Waterer,' which grows about two feet high, with rich crimson flowers. *Bumalda* and *ruberrima* are also red, and *alba* is a desirable white. None of these Spiraeas require much pruning, it being only necessary occasionally to thin out the old wood which has flowered.

For massing purposes the most desirable are *S. Douglasii* and *S. Nobleana*, each with red flowers, and *S. canescens*, with white flowers and very elegant whip-like stems. These require pruning late in every spring down to the very ground to produce the most satisfactory results. For single specimens, where they have sufficient room to fully develop, the following should be grown: *S. Aitchisoni* and *S. Lindleyana*, both large growers with white and cream inflorescences, *S. ariaefolia* or *discolor*, *bracteata*, a Japanese species and one of the very best, *S. confusa*, and *S. Van Houttei*.

All the Buddleias make good-sized specimens, and everyone is familiar with that old garden favourite *B. globosa*, with its little balls of golden flowers. Some varieties of *B. variabilis* of recent introduction are perhaps more ornamental, especially *B. v. Veitchiana* and *magnifica*, each with long panicles of violet blossoms. It is unfortunate that *B. Colvillei* is not hardy enough for many parts of the country, as it is the most beautiful of all. Several of the Ceanothus are among the most showy of flowering shrubs; anywhere north of London the majority need the protection of a wall to grow them well. The most desirable are *C. americanus*, on account of its absolute hardiness; *C. thyrsiflorus*; *C. rigidus*; *C. divaricatus*, and the various forms of *C. azureus*, of which 'Ceres,' 'Georges Simon,' 'Gloire de Versailles,' and 'Marie Simon' are all excellent.

It is to be regretted that our English summers are seldom warm enough to enable the Lespedezas to grow successfully, but *L. Sieboldi* is very satisfactory, though it generally dies to the ground every winter.

Diostea juncea, with its rush-like stems and pale lavender flowers, and its remarkable superficial resemblance to the Brooms (with which, however, it has in fact no connection), should be better known, and the same may be said of the uncommon dwarf-growing *Sophora viciifolia*, a recent introduction, and charming with bright violet and white flowers. Its habitat is the Chinese hillsides, which, I am told, it carpets just as the heather does our Scottish and Yorkshire moors. The Japanese tree paeonies, whether planted singly or in beds, are among the most gorgeous and beautiful of hardy shrubs, and some of the improved sort, which produce blossoms fully ten inches across, should be included in all gardens. They need a good soil and to be left undisturbed at the roots.

Leycesteria formosa is a pleasing old-fashioned shrub with rich green foliage and drooping racemes of chocolate and white bracts, which are succeeded by purple fruits. It is seen to the best advantage if pruned to the ground every spring, and is fine for grouping.

In a warm position *Styrax japonica* will prove hardy and produce quantities of its pure white flowers, but I fear *S. Obassia* is not hardy enough for cultivation in the colder parts of the country. Both are extremely beautiful where they succeed. *S. americanum* and *S. officinale* are also worthy of inclusion.

Clematis orientalis tangutica is a very beautiful and uncommon plant from Northern China, and is excellent for the shrubbery. It has large solitary pure yellow flowers, which never open fully, and are succeeded by a profusion of long silky filaments, which present a most quaint, if not unique, appearance.

Caryopteris Mastacanthus is one of our most pleasing autumn flowering shrubs with a profusion of blue flowers, but in very severe weather it needs protection. There is a white variety, but this is less hardy and vigorous than the type and hardly worth growing. *Hedysarum multijugum* is also a desirable shrub. It has soft, clear purple, pea-shaped flowers on long racemes, and is seen to the best advantage when the slender stems are supported by a stake, as it is naturally rather an untidy grower; it will, however, stand pruning perfectly well when that operation becomes desirable.

Clerodendron trichotomum, too, flowers in the autumn, and if given a warm position in a fairly rich loam makes a handsome specimen with large foliage and heads of red and white flowers. Suckers are produced

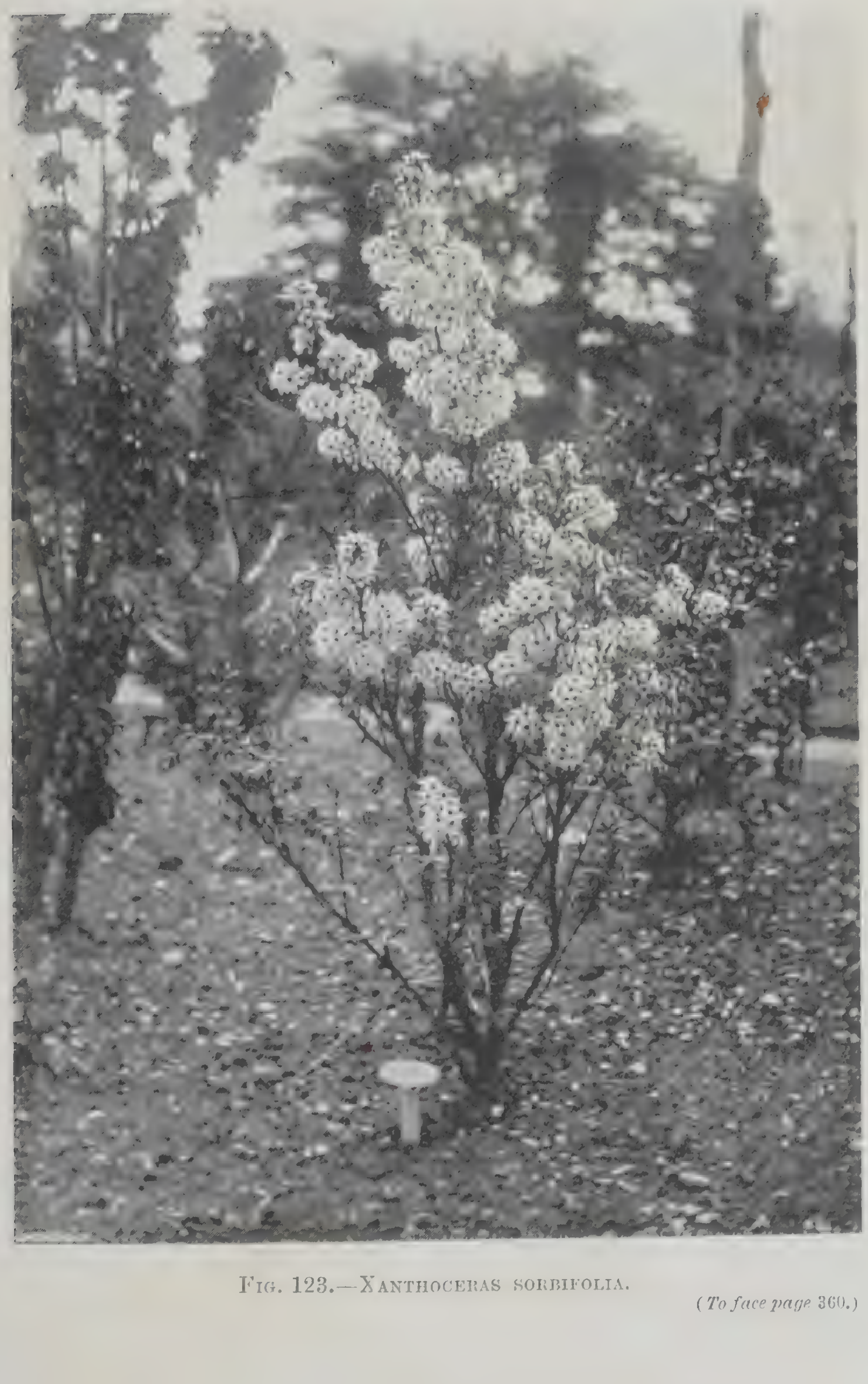

FIG. 123.—XANTHOCERAS SORBIFOLIA.

(*To face page* 360.)

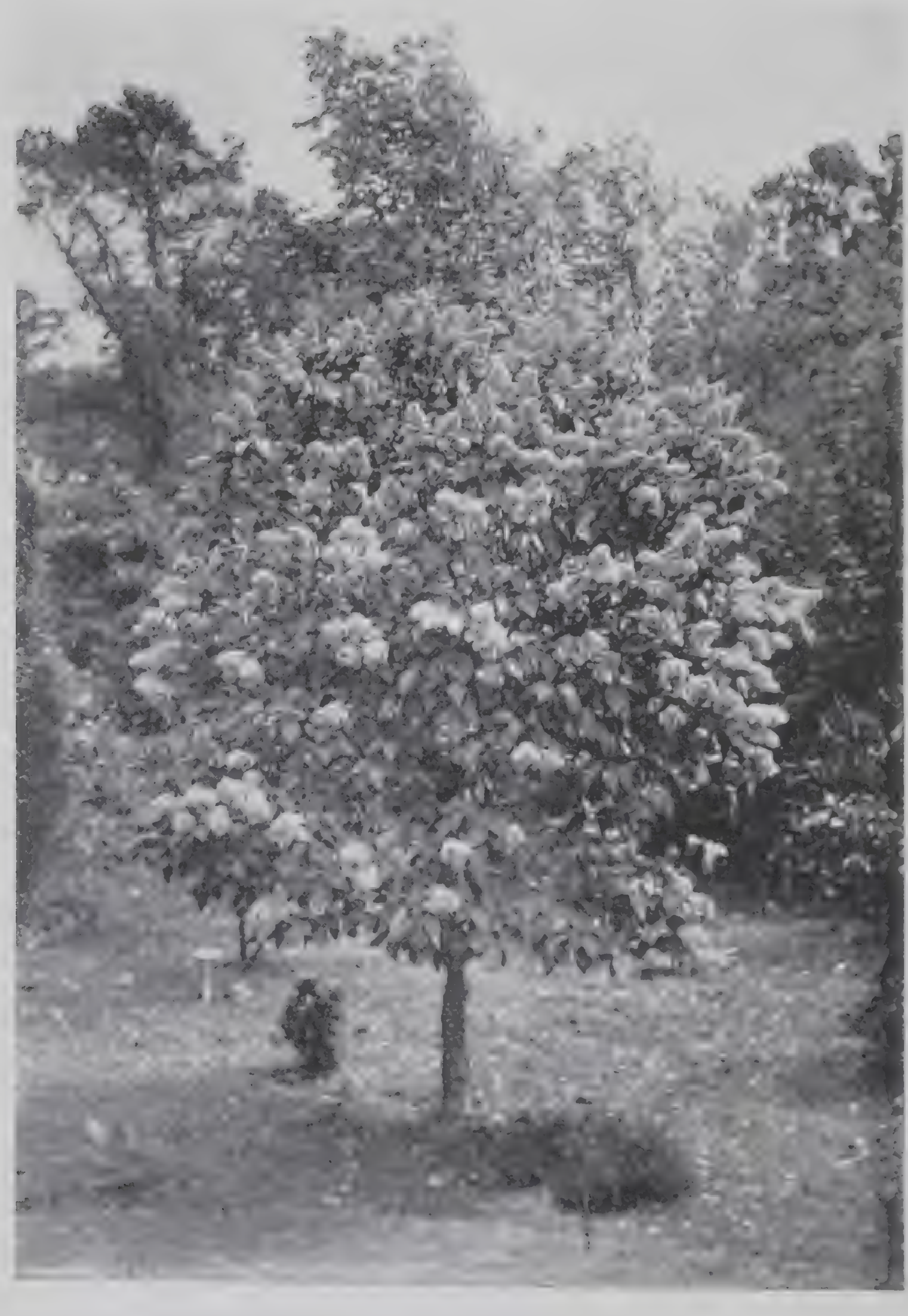

Fig. 124.—Syringa 'Souvenir de Louis Spath.'

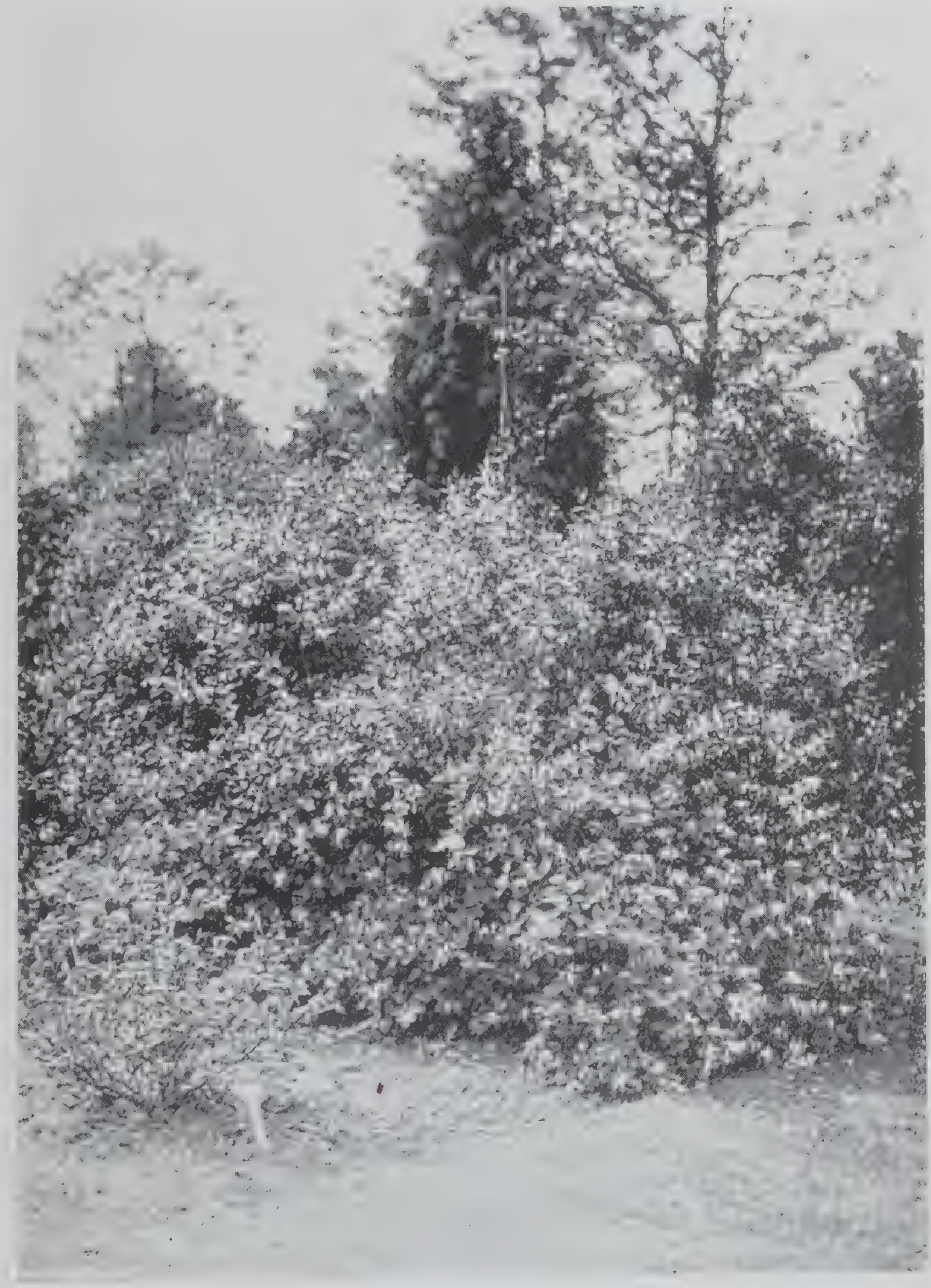

Fig. 125.— Lonicera Morrowii.

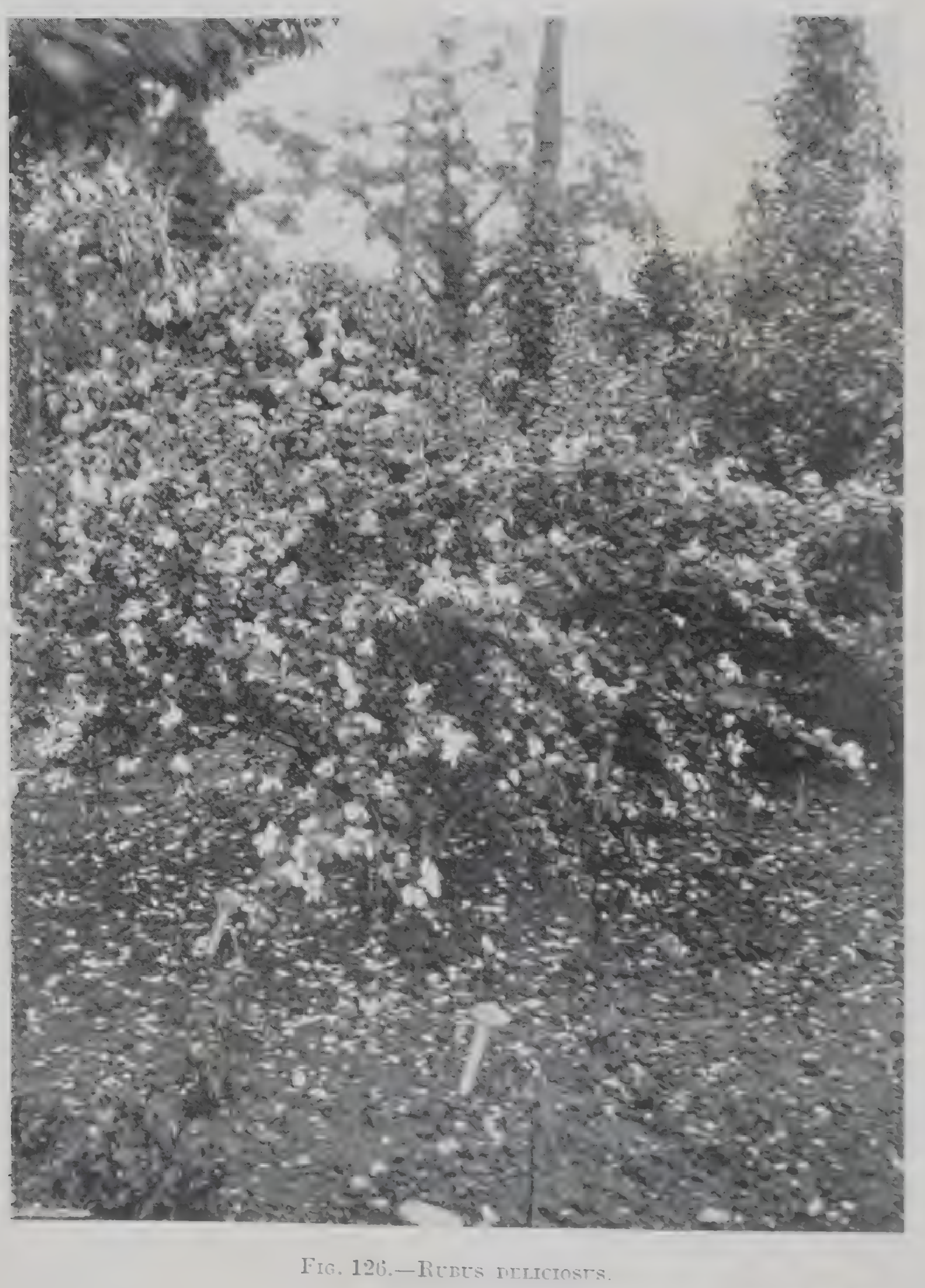

FIG. 126.—RUBUS DELICIOSUS.

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freely, and it is advisable to take these up and replant, as this shrub is short lived, or at any rate often dies off for no apparent reason.

Two small shrubs, closely akin botanically to the Spiraeas, with pleasing foliage which assumes a good brown colour in the autumn, are *Stephanandra flexuosa*, and the larger species *S. Tanakae*, of which the red twigs and free waving growth are ornamental. Neither of these should be clipped or pruned : not that such treatment injures their health, but because it totally destroys the special charm of their appearance. The delicate finely cut leaves of the former are liable to shrivel and burn if exposed to too hot a sun.

Few shrubs are more attractive in the early summer months than the Diervillas (or Weigelas, as they used always to be called), and they are also of easy cultivation in almost any kind of soil.

It is advisable to prune out the old wood fairly hard every year or two, and very large specimens can be given a new lease of life by cutting them clean down to the ground. They will break out again quite freely and quickly make good specimens. *Diervilla praecox* is the first to flower, and is succeeded by *D. florida* and *D. grandiflora*. Of the last two species there are a number of varieties and hybrids, and among the most desirable are 'Abel Carrière,' 'Conquête,' 'Eva Rathke,' *candida*, 'Dr. Baillon,' 'Isolene,' and *Van Houttei*. *D. florida Looymansii aurea* has golden foliage, which does not burn, and *D. floribunda versicolor* has very pleasing foliage—a mixture of pink, white, and green.

Although the elders (*Sambucus*) cannot in general be regarded as suitable for the select shrubbery, there are some worthy a place in all collections. The finest in flower is *Sambucus canadensis*, which carries a very large inflorescence of almost white flowers. It is an imposing plant, and succeeds well if cut down to the ground annually.

The cut-leaved golden form of *S. racemosa* is one of our best brightly coloured shrubs, and a variety called *tenuifolia* has leaves so attractive and finely cut as, at a little distance, to ape the outward look of a Japanese maple.

Very few shrubs are more generally appreciated than Philadelphus, and though the varieties and hybrids catalogued by foreign firms are bewildering in their multitude, nearly all are more or less worth growing where space is ample ; as far as I know, all except one hybrid have white flowers and the majority are very sweetly scented, nothing surpassing the perfume of *P. microphyllus* or *P. purpureo-maculatus*. To keep them vigorous and obtain as large an amount of flower as possible, the old flowering wood should be pruned out annually, so that strong basal shoots may be formed. The more desirable large growing sorts are *P. coronarius*, *Gordonianus*, *grandiflorus*, and *inodorus*, and of medium stature are *P. Lemoinei*, which has among the following hybrids bearing single or double flowers : 'Boule d'Argent,' 'Candélabre,' 'Avalanche,' 'Gerbe de Neige,' and *purpureo-maculatus*, the last being one of the finest shrubs we have. The flowers are single, of large size, most deliciously scented, and pure white in colour with a purple blotch at the base of each petal. *P. microphyllus*, with small flowers and small glaucous foliage, is one of the choicest.

One or two new species of Philadelphus which are among the latest of

Mr. Wilson's Chinese introductions, and have not yet been seen elsewhere in Europe, are growing quite happily at Aldenham, but it is too early yet to speak confidently as to their floral merits.

Halimodendron argenteum is one of the most pleasing of the Leguminosae and produces a profusion of deep rose flowers in July. As a standard it makes an extremely pretty pendulous specimen.

The *Calycanthus*, although not particularly showy, are desirable on account of their distinct appearance and agreeable scent. *C. macrophyllus*, *C. floridus*, a very rare and not over-hardy plant, and *C. glaucus* (usually miscalled *C. floridus* by nurserymen) all deserve a place in a good collection; the advantage of the first over the last of these three species consists in the bolder leaves and in having rich red instead of dull dark brown flowers.

The shrubby as distinguished from the climbing species of *Lonicera* (honeysuckles) contribute greatly to the charm of a wild garden and embrace a variety of colours, including white, yellow, and rose. Unfortunately our summers are not warm enough to induce them to fruit freely, but in America I believe they are extremely ornamental when loaded with their brightly coloured berries. Some of the most desirable are *spinosa*, *Morrowii* (fig. 125), *tartarica*, *syringantha*, a charming species from China, *chrysantha*, *involucrata*, and *Albertii*.

For grouping purposes or planting in semi-wild places some of the Rubus or Bramble family are very useful and decidedly ornamental, providing the old wood is kept pruned out annually; in many cases, too, the heavy crops of fruits are valuable. From a flowering point of view the most noteworthy is *R. thyrsoideus flore pleno*, which has very large spikes of double rose-coloured flowers in great profusion; *R. deliciosus* (fig. 126) should also be included; *R. ulmifolius foliis variegatis* is a charming variegated form of medium growth; *R. phoenicolasius*, the Japanese wineberry, presents a most pleasing appearance when the foliage is stirred by the wind, the under-surface of the leaves having a dense white tomentum. *R. odoratus* has large purplish-pink flowers, and if kept cut down to the ground annually it develops good foliage very suitable for grouping.

The Caraganas are a desirable genus of Leguminosae suitable for interspersing along the shrubbery border, all except one species having yellow flowers. The most common species is *C. arborescens*, which is a useful plant for grouping and will succeed in dry barren soil. The smaller-leaved kinds, such as *microphylla*, *pygmaea*, *Chamlagu*, and *cuneifolia*, make very pretty pendulous specimens when grafted on to standards of moderate height, the slender branches being clothed in their season with blossoms. *C. jubata*, the white-flowered species from Siberia, is a most curious and interesting plant, especially in winter. The common *C. arborescens* is to be seen growing wild all over Finland.

An uncommon and beautiful Japanese shrub suitable for favoured positions is *Caesalpinia japonica*, which has very graceful foliage and racemes of yellow flowers with conspicuous red anthers. In warm localities, around Bath for instance, it makes a large ornamental low bush in the open, but as a general rule it succeeds better as a wall plant if given a warm position in good loamy soil.

When seen in good condition few shrubs are more ornamental than the Deutzias, of which there are several species and numberless varieties, with white or rose-shaded flowers. Some of the most desirable, varying in height from three to six feet, are *corymbosa*, *balsamaeflora*, *Lemoinei*, *crenata* and its double variety, and *D. discolor purpurascens*.

Hypericums make a pleasing addition to the shrubbery during summer and autumn months, and are of very easy cultivation. They vary in height from one to four feet, and one, *H. calycinum*, is very useful as a carpeting plant, and all make good subjects for massing. The most desirable are *H. patulum*, *pyramidatum*, *aureum*, *Moserianum*, and its charming variegated variety, *Hookerianum*, *densiflorum*, *galioides*, and *prolificum*.

Few spring-flowering shrubs are more appreciated than the Cytisus, and as single specimens or when used in groups they are very effective. It is important that they should be planted in permanent positions (with two exceptions, *C. sessiliflorus* and *C. nigricans*), as they cannot be satisfactorily transplanted after becoming established. *C. praecox*, creamy white, *C. alba*, *C. biflorus*, *C. purgans*, *C. purpureus*, *C. Scoparius Andreanus*, *C. kewensis*, and *C. decumbens*, should all be included. *C. nigricans* is a late-flowering species, and one of the best.

The Genistas, *G. capitata*, form another genus of the Leguminosae, which provide us with numerous decorative yellow-flowered shrubs, and the same remarks apply to them as to the Cytisus. *G. virgata* and *G. aethnensis* both make tall shrubs with slender pendulous branches literally covered with flowers. The former is an excellent plant for the edge of woodland, and in a light soil it quickly becomes naturalized. *G. pilosa*, *G. prostrata*, and *G. radiata* are useful low-growing species, the last presenting a curious wiry appearance.

The hardiest Hydrangeas are extremely valuable for late summer and autumn flowering, the most noteworthy being *H. paniculata grandiflora*. A new form, *H. arborescens grandiflora*, is very showy and flowers with great freedom. *H. quercifolia* is worth growing on account of its fine foliage.

Halesias, or snowdrop trees, are very pretty in spring, with their pendent white blossoms resembling a snowdrop, and succeed best in a well-drained loam and warm position. *H. hispida* and *H. tetraptera* are the most satisfactory.

Everyone is familar with the bright red flowers of *Ribes sanguineum*, which, with its several varieties, includes some of the most showy spring-flowering shrubs. *R. Lobbii*, an uncommon species, is very distinct and pleasing; the flowers are claret-red. In a warm position or on a wall, *R. speciosum*, with bright scarlet fuchsia-like blossoms, has few superiors.

Although the Rhus family are not particularly attractive in flower, they are among the finest of all shrubs cultivated for autumnal colour, and, in addition, several have large handsome foliage. *R. glabra* var. *laciniata*, is fine for grouping, and so is *R. typhina*; *R. cotinoides* and *R. Cotinus atropurpurea* are yet uncommon, but both colour very finely if planted in a rather poor soil. For general purposes *R. Cotinus* is difficult to surpass. The poison ivy, *R. Toxicodendron*, is useful for planting over old logs and the like, and colours well, but it should be handled with care, and never planted against the walls of a dwelling house.

No shrubbery is complete unless some of the Viburnums are included, the most desirable being *Viburnum tomentosum* and its two varieties *plicatum* and *Mariesii*, *V. cassinoides*, *V. Sargentii*, *V. dilatatum*, *V. Rhytidophyllum*, *V. Tinus*, and *V. macrocephalum.*

All the Tamarisks are ornamental, and everyone is familiar with them on our southern coasts, where they grow with more vigour than inland. One, *Tamarix Pallasii rosea*, is conspicuous above all others, and the wealth of bright pink flowers makes it very attractive.

In a warm position both the single and double Hibiscus are very pleasing in late summer, and make handsome bushes if undisturbed. A good selection would include *totus albus*, 'Hamabo,' 'Bleu Céleste,' 'Boule de feu,' *violacea*, and *Leopoldii fl. pl.*

My remarks, so far, have referred almost entirely to shrubs of a deciduous character, but it must be remembered that some of our most useful shrubs, though not always so beautiful in flower, are to be found among the evergreens, and during the winter months especially, their persistent foliage, when so much else is bare, cannot fail to be welcome.

The planting of common evergreens in monotonous masses is but too often overdone, to the exclusion of more desirable yet by no means more expensive plants, but I only propose to deal with the choicer kinds.

Among the Berberis we find many excellent shrubs, and when in flower nothing surpasses them in the evergreen section. *B. stenophylla* is an extremely graceful hybrid, and the pendulous branches, when wreathed with fragrant blossoms, render it a thing of beauty, whether in the shrubbery or as a specimen on a lawn. *B. Darwinii*, of vigorous growth, can claim a place among the best shrubs, and so can *B. buxifolia*. *B. japonica* has very large strikingly ornamental foliage, and succeeds well in a loamy soil if undisturbed. In a sheltered spot, the similar but less robust *B. nepalensis* is also very fine. *B. Aquifolium* is, of course, one of our most useful dwarf evergreens, either in flower, fruit, or when the leaves colour highly in the winter. Like *Hypericum calycinum*, it has the rare merit of flourishing really happily under trees.

The Mexican orange, *Choisya ternata*, is at all times one of our most delightful evergreens, having deep green, glossy foliage and a profusion of white flowers in spring. Around London it succeeds as a bush, but in colder districts the protection of a wall is necessary.

Either as single plants or when planted in groups the Andromedas are always admired. Although one should no longer call them Andromedas, but *Pieris*, I give them under this name as it is more familiar. The most desirable, which it should be remembered require a soil composed of leaf mould or peat, are *japonica*, *arborea*, *speciosa*, and *floribunda.*

Very few dwarf-growing shrubs are more generally useful for many positions in the garden than the Cistus, as they are neat in character and all produce a profusion of blossom. Some of the species will not live through very severe weather, and none of them are really long lived, but all are easily increased and grow quickly from cuttings. They seem specially well adapted for planting among rockwork, and will grow freely in very poor soil. *C. crispus*, purple; *C. monspeliensis*, white;

C. ladaniferus, with a purple blotch on each petal; *C. corbariensis*, pure white; *C. purpureus*, purple; and *C. laurifolius*, white, are all worthy of inclusion.

Generally speaking, the Olearias cannot be recommended for other than sheltered gardens, as they come from Australia and New Zealand, but one which should be included on account of its hardiness is *O. Haastii*. This makes an excellent subject for grouping, and is grateful alike to the eye when in flower and when carrying its profusion of feathery seeds. In a sheltered position, with a slight protection in severe weather, *O. stellulata* makes one of our most beautiful shrubs. *O. macrodonta*, of which there appear to be two forms (one with very large heads of flower), makes a very desirable wall plant north of London, and succeeds perfectly in Surrey in the open. Other evergreens which should be included are *Daboëcia polifolia*, and its charming white variety; *Nandina domestica* (which is closely allied to the Berberis), in a warm position; *Berberidopsis corallina*, which makes a charming wall plant; Cotoneasters such as *formosa*, *buxifolia*, *horizontalis* and *rotundifolia*, *rugosa*, *Henryi*, and *applanata*, *Tricuspidaria hexapetala* or *Crinodendron Hookerii*, is a very beautiful shrub for a sheltered position away from cold winds and bright sunlight, and so is *Veronica Hulkeana*, which makes such a glorious shrub in the south-west.

This concludes the selection of shrubs I have made as desirable for general purposes, but there has been no attempt to render it exhaustive, and I am aware that many good plants have been omitted, although I have endeavoured to name some of those which can be relied upon to give satisfactory results in all gardens without a great amount of attention.

SPICE-, CONDIMENT-, AND PERFUME-PRODUCING PLANTS.

By J. A. Alexander, F.R.G.S.

[Read November 23, 1909.]

In endeavouring to describe in this short paper our most important spices I have added a few of the better known European plants that are in general culinary use as condiments, and some that may be more correctly classed as perfumes. It is among Eastern races that we find condiments and scents (possibly in a very crude form) in much more frequent use than with Western nations.

Classification of Products Enumerated.

Cruciferae.

Brassica (*Sinapis*) *alba* Boiss. White Mustard.—Europe, Asia, Africa.

B. nigra Koch. Black Mustard.—Europe, Asia, Africa.

B. juncea Coss. Indian Mustard.—Asia, &c.

Burseraceae.

Balsamodendron Myrrha Nees. Myrrh.—Arabia.

B. Opobalsamum Kunth. Gilead Balsam.—Arabia.

Myrtaceae.

Pimenta officinalis Lindl. Allspice.—Central America.

P. citrifolia Kostel. Bay rum.—Central America.

Eugenia caryophyllata Thunb. Clove.—Moluccas.

E. cotinifolia Jacq. Clove.—Mauritius.

Umbelliferae.

Apium graveolens L. Celery.—North Europe, Africa, Asia.

A. chilense Hook. America.

A. prostratum Labill. Australia.

Carum Carvi L. Caraway.—Europe, Asia.

C. copticum Benth. Asia.

C. Bulbocastanum Koch. Europe, Africa, Asia.

C. capense Sond. Africa.

C. Roxburghianum Benth. India.

C. segetum Benth. Europe, Asia.

C. Petroselinum Benth. Parsley.—Europe, Africa, Orient.

Pimpinella Anisum L. Anise.—Asia, Arabia.

P. Saxifraga L. Europe, Asia.

P. Sisarum Benth. Asia.

Coriandrum sativum L. Coriander.—Europe, Asia.

SOLANACEAE.

Capsicum annuum L. Central America.
C. fastigiatum Bl. Bird-eye chilly.—South America, Asia.
C. frutescens Bl. Spur pepper.—South America.
C. baccatum L. Cherry capsicum.—Brazil.
C. longum DC. Long capsicum.—America.
C. grossum Wild. America.

LABIATAE.

Mentha sativa L. Mint.—Europe, Asia.
M. aquatica L. Europe Asia.
M. arvensis L. Japan Peppermint.—Europe, Asia.
M. piperita L. Peppermint.—Europe.
M. rotundifolia Huds. Europe, Asia, Africa.
M. longifolia Huds. Europe, Asia, Africa.
M. viridis L. Spearmint.—Europe, Asia, America.
Origanum vulgare L. Marjoram.—Europe, Asia, Africa.
O. Majorana L. Europe, Asia, and Africa.
O. Maru L. Hyssop.—Palestine.
Thymus Serpyllum L. Thyme.—Europe, Asia, Africa, America.
T. capitatus Hoffmgg. & Link. Europe, Asia, Africa, America.
T. Mastichina L. Europe, Asia, Africa, America.
T. vulgaris L. Garden Thyme.—Europe, Asia, Africa, America.
Ocimum Basilicum L. Basil.—Asia, Africa.
O. gratissimum L. Asia, Africa.
O. sanctum L. Asia, Africa.
Pogostemon Patchouly Pellet. Patchouli.—India.
Lavandula augustifolia Bauh. Lavender.—Europe.
L. latifolia Bauh. Europe, Africa.
L. Stoechas L. Europe, Africa.
Salvia officinalis L. Sage.—Europe.
S. Matico Griseb. South America.

AROIDEAE.

Acorus Calamus L. Sweet Flag.—Europe, Asia, America.

PIPERACEAE.

Piper Betle L. Betel pepper.—India, Ceylon, Malaya.
P. nigrum L. Pepper.—India, Ceylon.
P. Cubeba L. Cubebs.—Java, Sumatra, Borneo.
P. longum L. Long pepper.—India, Ceylon, Malaya.
P. sylvestre Lam. Wild pepper.—Ceylon.

MYRISTICACEAE.

Myristica fragrans Houtt. Nutmeg.—Molaccas, Amboyna.

LAURINEAE.

Ravensara aromatica J. F. Gmel. Madagascar clove.—Madagascar.
Cinnamomum zeylanicum Nees. India, Ceylon, Malaya.

C. Camphora Nees. Camphor.—Formosa, China, Japan.
C. Cassia Bl. (=*Cassia lignea.*)

ORCHIDEAE.

Vanilla planifolia Andr. Vanilla.—Mexico.

SCITAMINEAE.

Curcuma longa L. Turmeric.—Tropical Asia.
Amomum Melegueta Rosc. Asia, Africa, Ceylon.
A. masticatorium Thw. Asia, Africa, Ceylon.
A. pterocarpum Thw. Asia, Africa, Ceylon.
A. aromaticum Roxb. Grains of Paradise.—India.
Elettaria Cardamomum Mat. Cardamom.—East Indies.
E. Cardamomum var. *major* Wh.
Zingiber officinale Rosc. Ginger.—Tropical Asia.
Alpinia Galanga Willd. Greater Galangale.—Java, Ceylon.
A. officinarum Hance. Chinese Galangale.—China.

GRAMINEAE.

Andropogon Calamus Royle. Sweet cane.—Central India.
A. muricatus Retz. Kus-Kus.—India.
A. Martini Thw. Citronella grass.—Southern Asia.
A. Nardus L.
A. refractus R. Br. Australian Lemon grass.—Australia.
A. Schoenanthus L. Scented Lemon grass.—Asia, Japan, Africa.
A. flexuosus Nees. Malabar Lemon grass.—India.
A. citratus DC. Lemon grass.

SPICES, CONDIMENTS, ETC.

IMPORTS INTO UNITED KINGDOM DURING 1908.

Cinnamon.

	lb.		£
From Foreign Countries	92,000	value	2,000
,, Ceylon	761,000	,,	16,648
,, Other Countries	120,000	,,	3,200
	973,000		21,848

Ginger.

	cwt.		
,, Japan and Formosa	4,442	,,	5,700
,, Other Countries	420	,,	520
,, India	18,000	,,	34,000
,, West Indies	13,000	,,	44,000
	35,862		84,220

Pepper.

	lb.		
Germany	44,000	,,	588
Netherlands	286,000	,,	4,500
Java	847,000	,,	18,440
France and French Colonies	68,200	,,	1,120
Siam	932,150	,,	18,820
Japan and Formosa	339,120	,,	6,820
Other Countries	130,000	,,	2,600
	2,646,470		52,888

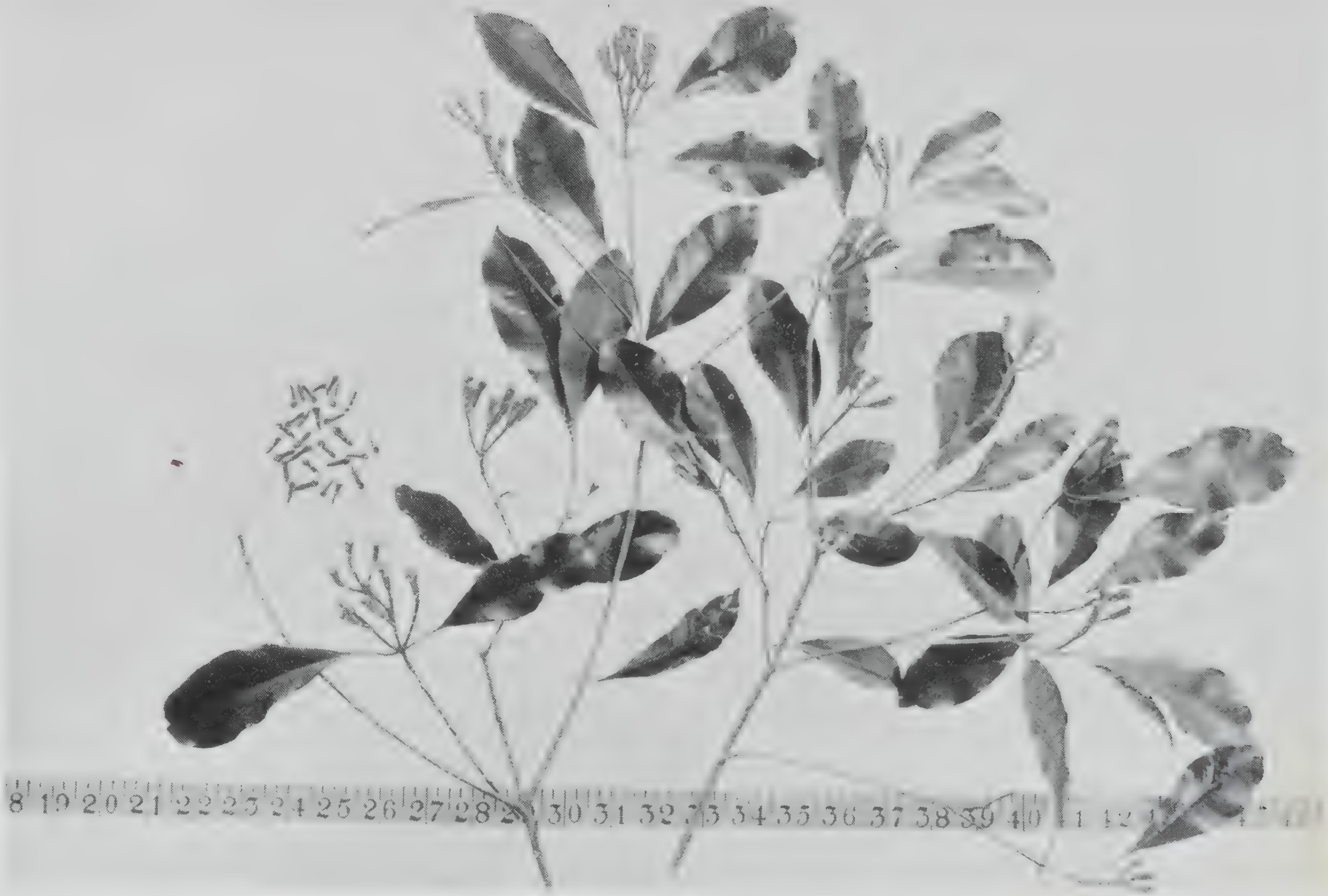

Fig. 127.—Clove (Eugenia caryophyllata) showing Flower Buds, Green and Dried.

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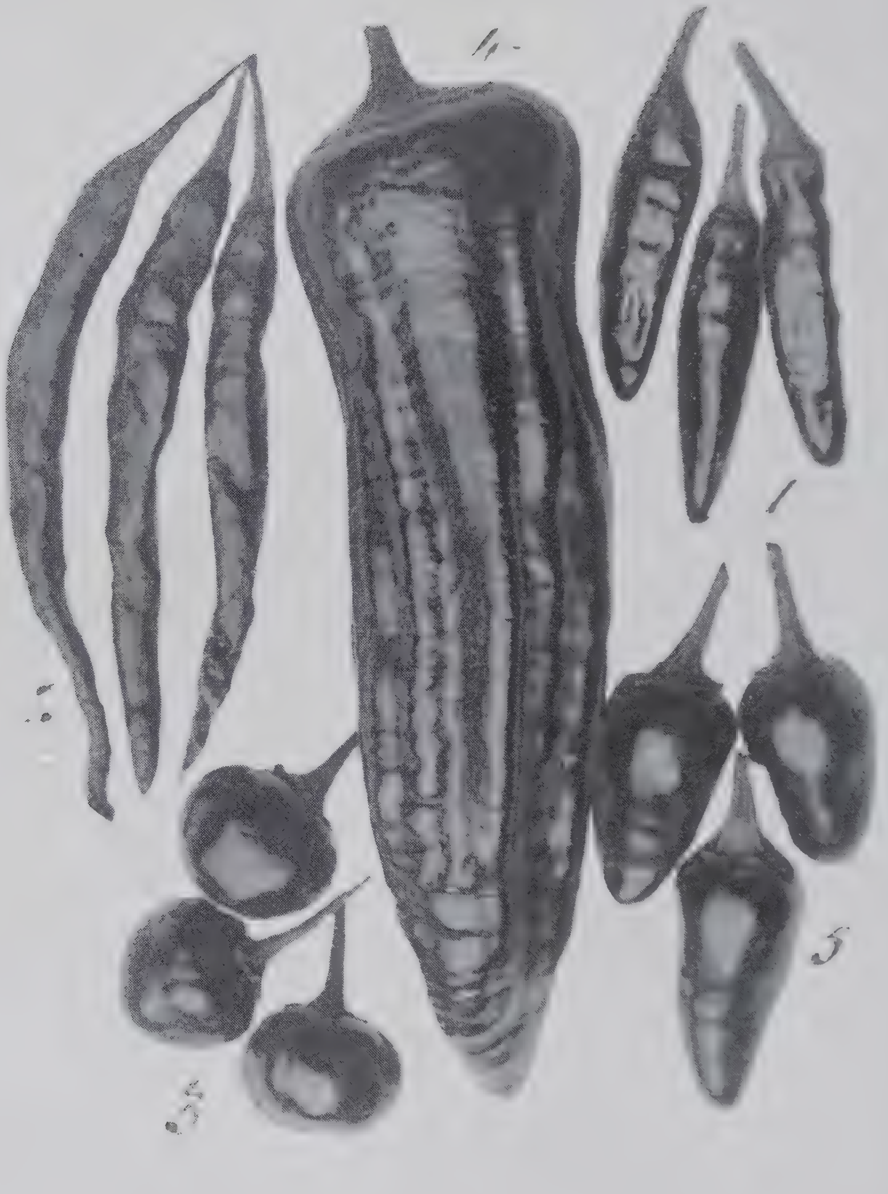

Fig. 128.—1, Capsicum fastigiatum; 2, C. frutescens; 3, C. baccatum 4, C. Longum; 5, C. grossum.

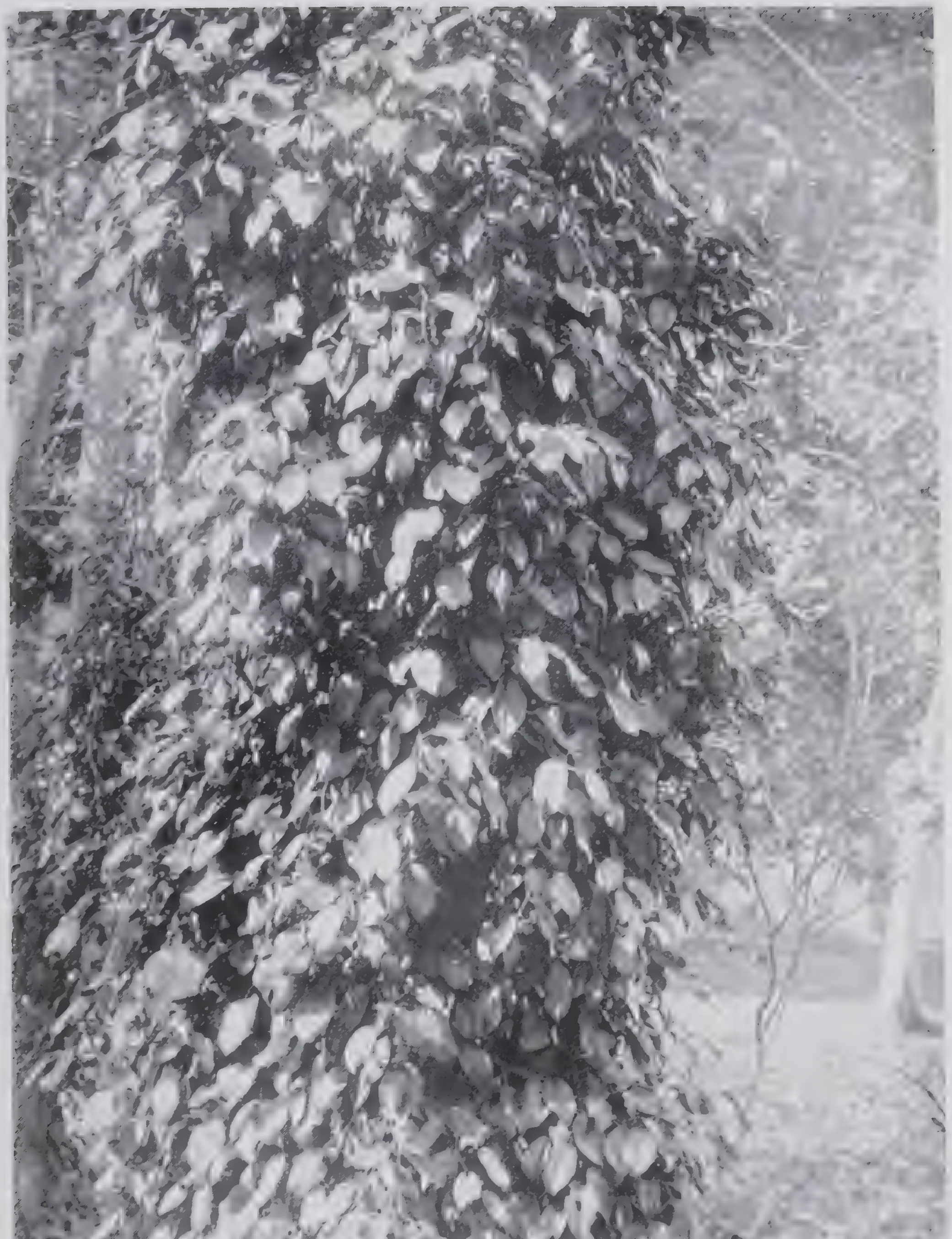

FIG. 129.—PIPER NIGRUM GROWING IN JAK TREE (ARTOCARPUS INTEGRIFOLIA).

[illegible] [illegible]

([illegible])

	lb.		£
Sierra Leone	1,680	value	38
South Nigeria	312,000	,,	2,656
Zanzibar and Pemba	5,540	,,	76
British India	833,000	,,	18,300
Straits Settlements	11,000,000	,,	190,342
Ceylon	103,400	,,	1,866
Other British Possessions . . .	28,000	,,	600
	14,929,090		266,766

UNENUMERATED SPICES, ETC.

From Germany	208,721	,,	2,729
,, Netherlands	175,700	,,	6,146
,, France	13,840	,,	137
,, China	130,180	,,	2,127
,, Japan	123,000	,,	1,080
,, U.S. America	376,000	,,	4,025
,, Other Foreign Countries . .	120,000	,,	3,000
	1,147,441	,,	19,244
,, Zanzibar and Pemba . . .	2,636,700	,,	73,570
,, Britsh India	30,000	,,	630
,, Straits Settlements . . .	487,000	,,	16,080
,, Ceylon	18,000	,,	705
,, Hong Kong	765,000	,,	17,520
,, British West Indies . . .	5,663,230	,,	86,900
,, Other British Possessions . .	82,000	,,	759
	10,829,371		215,408

MUSTARD.

Three species are cultivated for commercial purposes. In Europe, America, and the temperate parts of Africa and Asia *Brassica (Sinapis) alba* and *Brassica (Sinapis) nigra* are grown.

Brassica alba, White Mustard.—An annual; the seeds are less pungent than those of the black mustard, but are used in a similar manner. It prefers argillaceous ground, and 1,400 pounds of seed from an acre is considered a good crop. It is a most valuable green manure and excellent sheep-fodder.

Brassica nigra, Black Mustard, succeeds over a greater range of latitudes than the preceding species. The seeds crushed and passed through a sieve constitute the mustard of commerce. The seeds of this species are preferable for medicinal purposes. Through aqueous distillation a volatile oil of extreme pungency is obtained from mustard seeds.

Brassica juncea is the species cultivated in tropical countries—India, China, and Africa.

The markets of the world are supplied with mustard seed from India, China, America, and a few of our Continental neighbours. The seeds in Japan are extensively pressed for oil. The mustard is a good salad plant, and also largely raised in India and China for pickle. When separated from the seed the husk is not wasted, but subjected to a process of steaming before the oil is crushed out. The husk is finally converted into cake for manure. The oil is used for various purposes, and as an embrocation for rheumatic ailments it is of high value, while for a cold on the chest there is nothing to beat a mustard plaster.

We find the largest areas under mustard in this country in Yorkshire, Lincoln, Cambridge, and Essex. The annual export of mustard seed from India is about 1,500 tons, and Holland is also a large exporter to the United Kingdom.

MYRRH.

More than one species of *Balsamodendron* is said to produce the commercial Myrrh. They are small-sized trees of the Arabian deserts, and are widely cultivated in the tropics.

Gilead Balsam is furnished by *Balsamodendron Opobalsamum*, a small tree of Arabia. Two closely allied congeners are *B. capense*, of tropical South Africa, and *B. Mukul*, of Northern India, both producing a highly scented substance.

The oily, aromatic, resinous substances, Myrrh and Gilead Balsam, are mentioned in the earliest writings of the Egyptians and Arabians.

ALLSPICE.

The cultivation of *Pimenta officinalis* has extended from Central America and the West Indies into all tropical countries.

It is an ornamental evergreen tree, preferring rich soil, and can be grown to about 3,000 feet elevation to advantage, ripening its fruit readily. A pleasant aromatic spice is obtained from the berry. It is supposed to contain the flavour of cinnamon, nutmeg, and cloves, and hence the name.

Jamaica supplies the world's requirements, and the Pimento walks are to be seen on the mountains on the north side. An average yield from a tree is 150 lb. The berries ripen in July. The total returns are given at seven million pounds, value £30,000.

In 1906 the shipments of Pimento from Jamaica are given at £78,900, the maximum yield of any year.

Pimenta citrifolia is a pretty evergreen tree widely distributed in the tropics: from the flowers and leaf buds an agreeable spirit, which is extensively used in perfumery, is distilled. The leaves are also used as a condiment for the same purpose as the Sweet Bay (*Laurus nobilis*).

CLOVES.

Two species of "cloves" are generally cultivated throughout the tropics (fig. 127). They form pretty evergreen trees, easily grown, prefer shade, and flower freely up to 2,000 feet elevation. Where they succeed their cultivation is highly profitable. The unexpanded flower bud is the article of commerce. After being gathered the buds are toasted over a wood fire, smoked and partially dried, and then finished in the sun. The world's consumption of cloves is limited, and in some seasons the production is double the demand. Owing to its very pungent flavour small quantities are sufficient in condiments and decoctions. Zanzibar and Pemba produce about seven million pounds annually, valued at £98,000. The entire trade is in native hands, and the cloves are shipped to Bombay and afterwards distributed to America and Hamburg. Being a favourite spice with the natives of India the consumption is great. History records that in A.D. 180 cloves were imported into Europe from India, and that they were known in Egypt at that date.

CELERY.

Three species are cultivated, and the seeds are an excellent condiment, being much used by the native races in tropical countries. *Apium chilense* is commonly grown in Western America for ordinary culinary use. *A. prostratum* is the Australian celery and can be utilized as a culinary vegetable, but not in a raw state.

Celery seed is sometimes adulterated with ground rock.

CARAWAY.

Caraway forms an excellent condiment. Among the many uses to which it is put is that of scenting soap and cheap essences in perfumery; and it is used still more in the preparation of some liqueurs. On rich soil as much as 20 cwt. of seed has been produced from an acre. Five allied species are grown for the same domestic purposes.

Carum copticum.—The seeds of this annual herb form an excellent culinary condiment with the flavour of thyme. Its peculiar oil is accompanied by cymol and thymol.

C. Bulbocastanum is in common cultivation in Northern India and Kashmir. The roots and leaves serve as a culinary vegetable.

C. capense is cultivated in South Africa, where the aromatic root is called feukelwortel.

Carum Roxburghianum and *C. segetum* are both extensively cultivated for curries in India.

PARSLEY.

This well known biennial culinary herb is always desirable on pastures, as a preventive or curative of some kidney diseases of sheep, horses, and cattle. The essential oil of the fruits contains a peculiar stearoptin. The plant was much used for garlands and wreaths in ancient times. Possibly this plant is one of our most useful condiments in flavouring food and in garnishing dishes. Its root is an aperient.

ANISE.

This annual plant is extensively grown in Greece, Egypt, and Persia. The seed-like fruits enter into various medicines and condiments, and are required for the distillation of an oil rich in anethol.

Pimpinella Saxifraga.—A perennial herb; its root used in medicine. A peculiar and particularly powerful volatile oil can be distilled from the root.

Pimpinella Sisarum.—Cultivated in Eastern Asia. The bunches of small tubers afford an excellent culinary vegetable, with a sweet taste, somewhat like celery. This plant has never been found wild.

The true "Star-anise," *Illicium anisatum*, is a small tree of South China, with a fruit from which oil is extracted.

CORIANDER.

An annual or biennial herb found in temperate and tropical countries, and cultivated in the east of England and on the Continent. Fifteen hundredweight to the acre is reckoned an average crop. Its seeds are much used for condiments, in flavouring gin, and in the preparation of curry powder. The Egyptians, Persians, and Indians use it largely in curries.

It produces a peculiar essential oil, of a high carminative value.

CHILIES AND CAPSICUMS.

The capsicums (fig. 128) are annual or perennial plants, cultivated in all the warmer parts of the globe, and often grown as a catch crop between the rows of permanent plants in new clearings, in such positions yielding abundant crops. *Capsicum annuum* is more confined to Central America and the West Indies. It is a heavy cropper, and yields the material for cayenne pepper.

C. fastigiatum is the bird-pepper of America.

C. minimum (the birdseye chili) is extensively cultivated in Asia, Africa, and America, and turned to use in everyday meals.

C. frutescens is the long, tapering capsicum, possibly more commonly cultivated in European gardens than the other species. It is extensively cultivated in Eastern Asia, and is a product successfully handled by the natives. It is converted into cayenne pepper.

C. grossum is the large red-fruited species and very pungent.

The summers of the warm temperate zone admit of the successful growth of at least the annual species of capsicum.

Mexico is the largest cultivator of this product, and large areas are annually planted under high cultivation and irrigation. Many growers prefer evaporating instead of sun-drying. The temperature must be kept at 110° F., and in this way the dryer can be filled every four hours. Sun-dried chilies fetch the best prices. An acre may produce 2,400 lb. of dried peppers.

The hot, pungent property of the fruit of the Capsicum is due to the presence of an alkaloid known as capricine, and from this property the genus received its name, derived from the Greek "kapto," to bite. Capsicums are used chiefly as a condiment, but have also a medicinal value. Besides being dried and ground for use as pepper the fruit is used when green for pickling, and when ripe for mixing with tomatos, &c. to make sauces. There is an enormous consumption of chilies in India, where they form an important ingredient in the curries and chutneys in general use; when ground into a paste between two stones, with a little mustard, lard, oil, ginger, and salt, this forms the only seasoning which the millions of poor people in the East can obtain to flavour their insipid rice. They are employed in medicine in combination with cinchona in intermittent and lethargic affections, and also in atomic gout. In native practice in India they are prescribed for many ailments.

Cayenne pepper is adulterated with powdered sawdust.

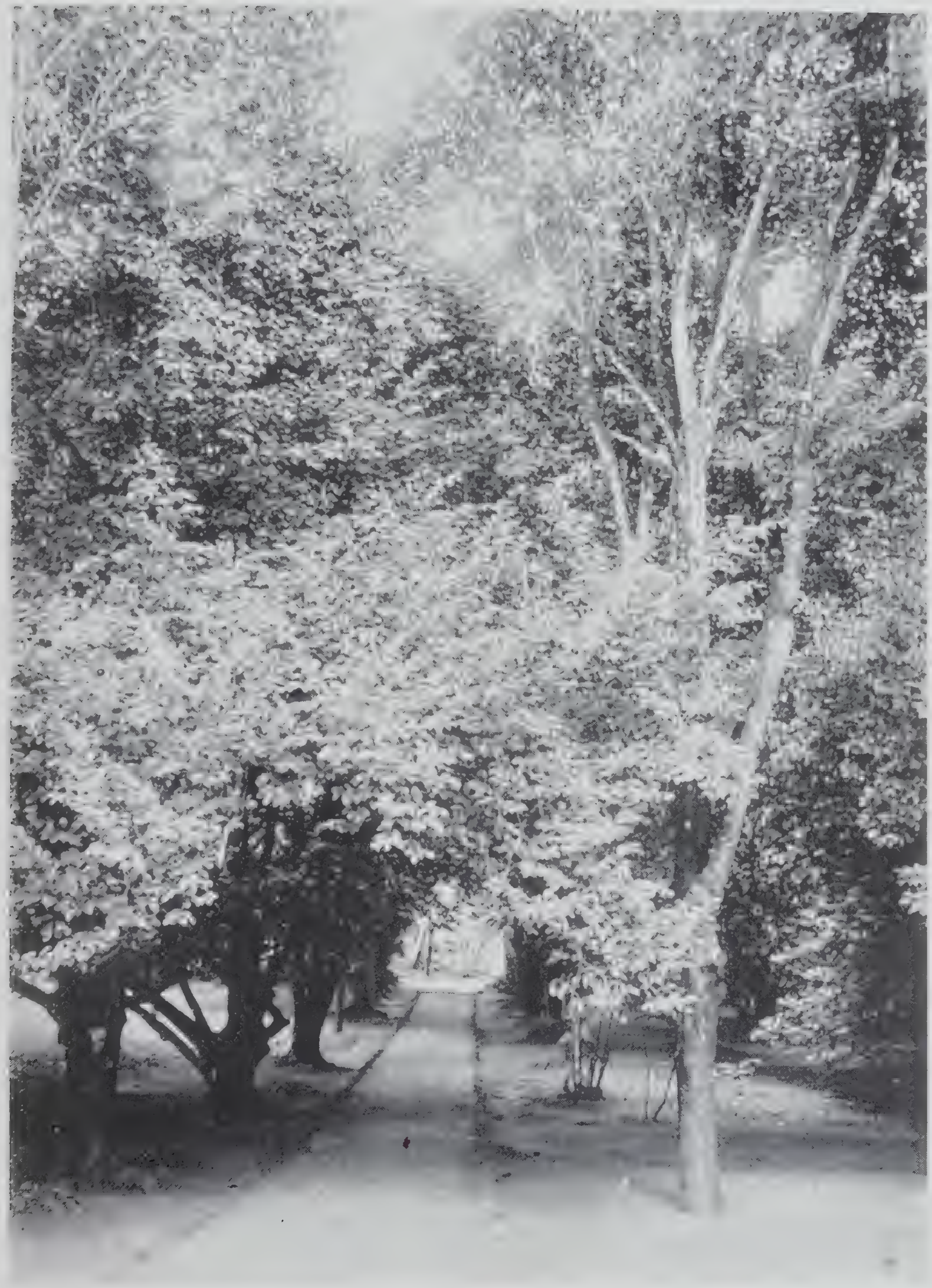

Fig. 131.—A Grove of Nutmegs.

(*To face page 372.*)

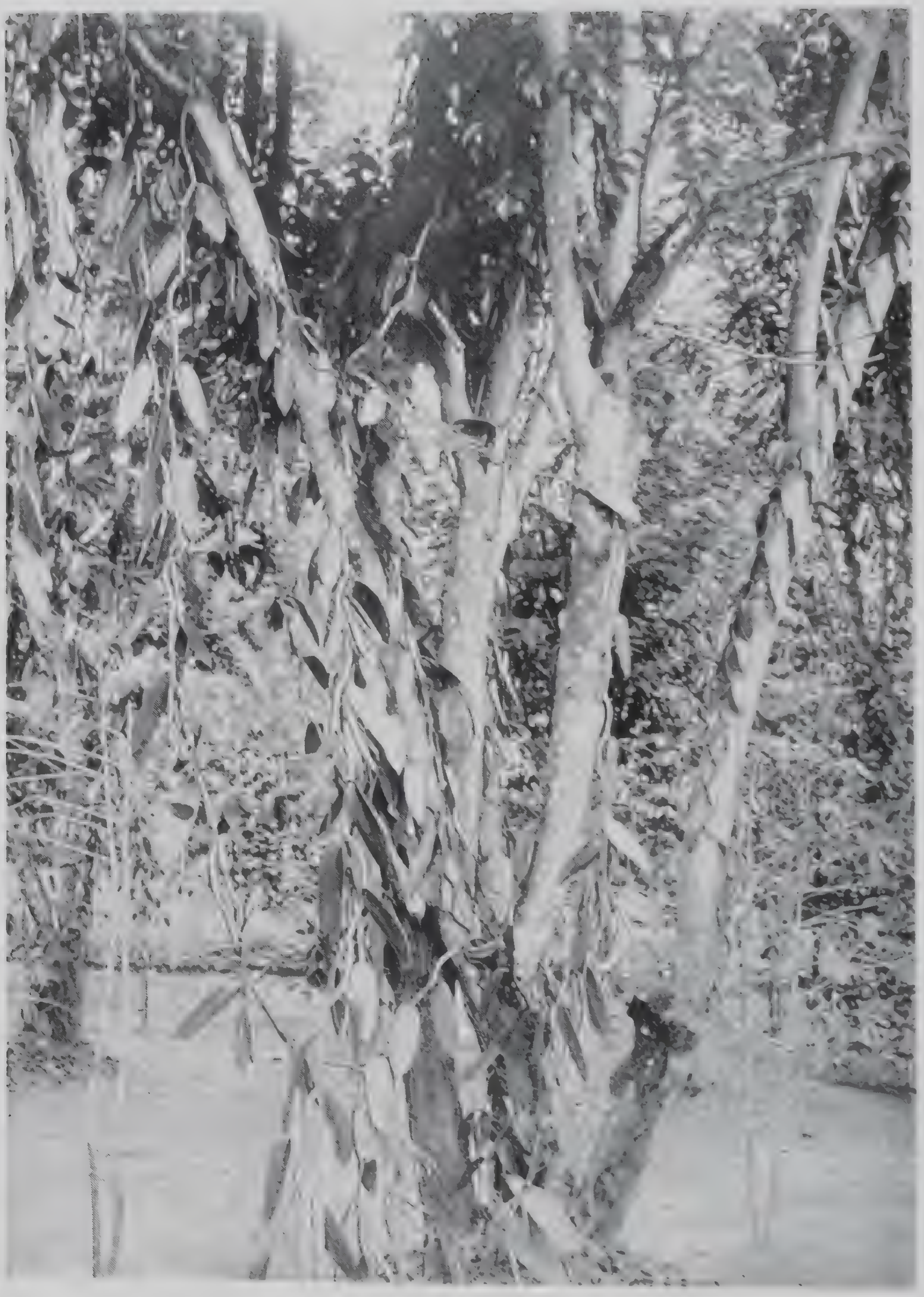

FIG. 132.—VANILLA PLANIFOLIA.

A remarkable export came from Uganda in 1906—chilies to the value of £19,000—and the next export was in 1908, when only £845 worth was shipped.

It may be mentioned here that in 1906 there were exported from Singapore, mostly to Java and Siam, curry stuffs to the value of 914,000 dollars, and from Penang 443,600 dollars' value.

These exports included Chilies, Garlic, Onions, Coriander seed, Beans, Peas, Turmeric, Pepper, Yams, and Sweet Potatos.

MINTS.

About twenty-five species of *Mentha* are known, mostly of northern temperate regions. The dried plant is pounded into a spice and turned to various domestic uses.

M. arvensis is the Japan peppermint, and has been known for at least two thousand years. From the distilled oil of this by refrigeration the crystalline menthol is obtained in unusually large proportions for medicinal purposes.

M. Piperita.—The Peppermint is a well-known perennial herb, important for its peculiar essential oil. This distilled oil is in considerable demand, and is obtained from the plants cultivated in mountain regions or naturalized along forest rivulets.

The annual production of Oil of Peppermint from the American States is estimated at 100,000 lb. Experienced growers say that from one ton of the cut herbs 7 lb. of oil can be distilled, worth 55*s.* per lb. An acre will produce three tons of cut herb, the returns working out at £36 15*s.* to the acre.

M. Pulegium is the true Penny-royal, yielding a peculiar ethereal oil. It is a most undesirable pasture plant.

M. rotundifolia and *M. longifolia* are the species cultivated in France and Italy, and very profitably utilized. More attention is given by the rural inhabitants on the Continent of Europe than in the British Isles to the cultivation of sweet herbs.

M. viridis.—Spearmint, chiefly grown in Middle and Southern Europe. All the mints are readily propagated by division of the root. In its cultivation top-dressings of rotten farmyard manure, soot, wood ashes, and fine bone dust are regularly applied. The plant quickly responds to treatment.

MARJORAM.

From the numerous species known about ten are found in cultivation, all perennial herbs. They are very sweet-scented, often used for condiments, and produce a pleasant volatile oil. They are much employed in French factories of scented soap. All grow best on a limestone soil. Marjoram and Hyssop are among the common herbs of the Egyptians and in general use in embalming.

THYME.

Possibly one of the longest and best known of our herbs. Since the time of Hippocrates this small scented plant has been employed for scent condiment and in medicine.

All the five species are valuable honey plants. The essential oil can be separated into the crystalline thymol and the liquid thymen and cymol. About fifty species are known, from the Mediterranean coast to the highest Alps, North-Eastern Africa to Northern India and Western Tibet.

BASIL.

Annual and perennial herbs extending over the civilized world, comprising about forty species, and common weeds in many countries where indigenous. They are favourites with the natives in the tropics and hardly a garden is to be seen without a plant.

The three species named in the list are the most common in cultivation, and are to be seen from India to Australia, across to America and Africa. The plant has many valuable uses in condiments, perfumery, and as a febrifuge, and the species differ considerably in their scent.

PATCHOULI.

A most popular garden plant, with a particularly agreeable perfume. It is common in India, wild and cultivated. One hundredweight of the herb yields about 28 oz. of oil; but the essence is chiefly obtained by enfleurage. A cephalic snuff highly appreciated by the natives is made from the dried leaves.

LAVENDER.

Two species are commonly grown in Europe, *Lavandula angustifolia* and *L. vera*. The lavender plant prefers dry soil and succeeds well on the open heath lands in some of our English counties. One of the best plantations I have seen is on calcareous land in Dorsetshire. The Breadstone Lavender Farm is about 400 acres in extent, only started a few years ago and now proved a financial success.

Lavender is not the only cultivation carried out, for roses cover two acres, with certain portions in Thyme, Balm, Mint, and other essential oil-bearing plants.

There are two cuttings of Lavender during the season, first in July and second in September. Propagation is by seedlings, root division, and by cuttings. When cut down annually for distillation purposes the plantation requires renewing every four years. From a good growth in a season a return of from £75 to £100 from the acre is realized.

L. latifolia, more grown in the South of Europe, is the richest yielder of oil. The quality of the oil of the different species seems to vary according to their locality of growth.

L. Stoechas is found in cultivation in Australia. The plant is utilized for oil distillation and other purposes. It grows quickly and comes into bloom early, and will remain in full flower for five months. Seeds will keep for five years. Seed which falls germinates, so that around each bush many seedlings will be found. Bees are passionately fond of the nectar of the flowers. One grower calculates that a ton of the finest flavoured honey can be obtained annually from an acre of this Lavender. In tropical countries the Lavender likes some shade.

SAGE.

There are no less than 450 species of Salvia, tropical and temperate, but only a few species are of commercial utility. The common sage is a shrubby plant of medicinal value, pervaded by essential oil used in condiments, found over a wide range of Europe. It was grown by Imperial order in the gardens of Charles the Great.

Salvia Matico is an important medicinal herb in America.

SWEET FLAG.

The sweet flag is a perennial marsh plant. The flavour of the root depends mainly on a peculiar volatile oil.

It is used as a stomachic and also in the preparation of confectionery, in the distillation of gin and liqueurs, and in the brewing of beer. The plant has a wide range through Europe, North Asia, and North America.

PEPPER, CUBEBS, &C.

The genus *Piper* is a large one, comprising nearly fifty species, scattered over a wide range of the Eastern tropics. About twelve species produce pepper of commercial value in a wild or cultivated state.

Piper Betle.—Betel leaves are a universal masticatory, and considered to be stimulant and carminative; the whole plant has a peculiar and characteristic odour and taste. Betel is the Malabar name given by early writers: doubtless allied to the Tamil name. This is the most common species cultivated in India and Ceylon and a heavy cropper; will grow successfully up to 2,000 feet elevation.

Piper nigrum (figs. 129, 131), with other species that are cultivated, affords the ordinary "black pepper" of commerce. It is indigenous to the forests of Southern India, Malay Archipelago, &c.

Black pepper is gathered in a green state and then dried, when the shells and seeds are all ground together, thus retaining a black and coarse appearance. Black pepper is adulterated with bean flour and ground olive stones.

Piper Cubeba is considered to be a native of Java, Sumatra, and Borneo, and is largely cultivated in the Malay Peninsula. The cultivation of Cubebs as a commercial pursuit appears to be carried on only in certain parts of Java and Sumatra, and the business is entirely in the hands of the natives. The dried fruits which form the Cubebs of commerce come into trade through Singapore. No special preparation or cultivation is carried out; the plants are grown in the ordinary way—only that the fruits are gathered before they are quite ripe, and carefully dried. It is difficult to obtain the true Cubebs, for several other species approach it very closely, and are passed off in the trade as the genuine article.

Piper longum.—The fruiting spike, when dried, forms the "Long Pepper" of commerce. This species has a wide distribution, producing a large yield of fruit, on rather a limited growth of vines, every year. Ceylon-grown Pepper commanded a high price, and was reported as far back as 1650. The Dutch exported about 1738 nearly one million pounds of pepper. They formed gardens and gave every encouragement to its cultivation, endeavouring to stir up the indolent natives. Pepper is one of the best and most suitable products that the natives can profitably cultivate. It is well adapted to their village environments. It is only in recent years that Europeans have taken up pepper culture on their acquiring lowlands for other more important products. In India, Ceylon, Burma, Borneo, and the Straits its cultivation has been carried out, with highly remunerative results. Certain trees have been found more adapted for the creeping vines of the pepper, and a regular planting done with *Eriodendron anfractuosum*, White Cotton tree, *Erythrina indica* and *E. lithosperma* and *Jatropha Curcas*. The common indigenous trees about the villages will be found covered with the pepper vines. On many of the tropical fruit trees the pepper vine grows luxuriantly, such as the Mango, Jak, Breadfruit, Rose Apple, Mangosteen, and many others. In Burma and the Straits, owing to the white ants, teak posts are used for supports for the pepper vines, but as with other creeping plants it is found that the vines prefer live supports to grow upon.

In Java the Dutch Government cultivate pepper on a regular system, trained over trellis-work or posts, not unlike the vine in France, a plantation having alternate rows of pepper creepers and coffee trees. The *Eriodendron* is planted wherever desirable. The propagation of pepper is simple, the method being by cuttings. Seedlings are slow in forming a plant.

The world's production of Pepper is about eighty millions of pounds: India, twenty; Java, twenty; Straits, ten; Borneo, four; Sumatra, fifteen; Siam, six; Ceylon, one.

The gathering and preparation of pepper for the market is simple, with a minimum of cost. The whiteness of the seed capsules is ensured by bleaching with the fumes of sulphur.

In 1906 the value of the exports of black, long and white pepper from Singapore was estimated at 8¼ million dollars, and from Penang at nearly 2 million dollars.

NUTMEG.

The nutmeg (fig. 131) forms a very handsome evergreen tree, preferring good soil in the sheltered river valleys. It is a native of the Eastern Moluccas, and is cultivated in Java, Malaya Peninsula, Straits Settlements, and Ceylon. In recent years its cultivation has increased; the trees come into bearing in eight or ten years. The mace is a beautiful network inside the fruit-shell, covering over the nutmegs. Particular care is necessary in drying the nutmegs and mace, when careful packing is done for transport.

The nutmeg produces staminate and pistillate flowers on different trees, and it is therefore necessary to have flowering trees of both sexes in every plantation.

Java is the largest exporter of nutmegs, reaching as much as one million pounds in a season, with half a million pounds of mace. In 1906 the shipments of nutmegs and mace from Singapore were valued at 476,000 dollars, and from Grenada at £20,620.

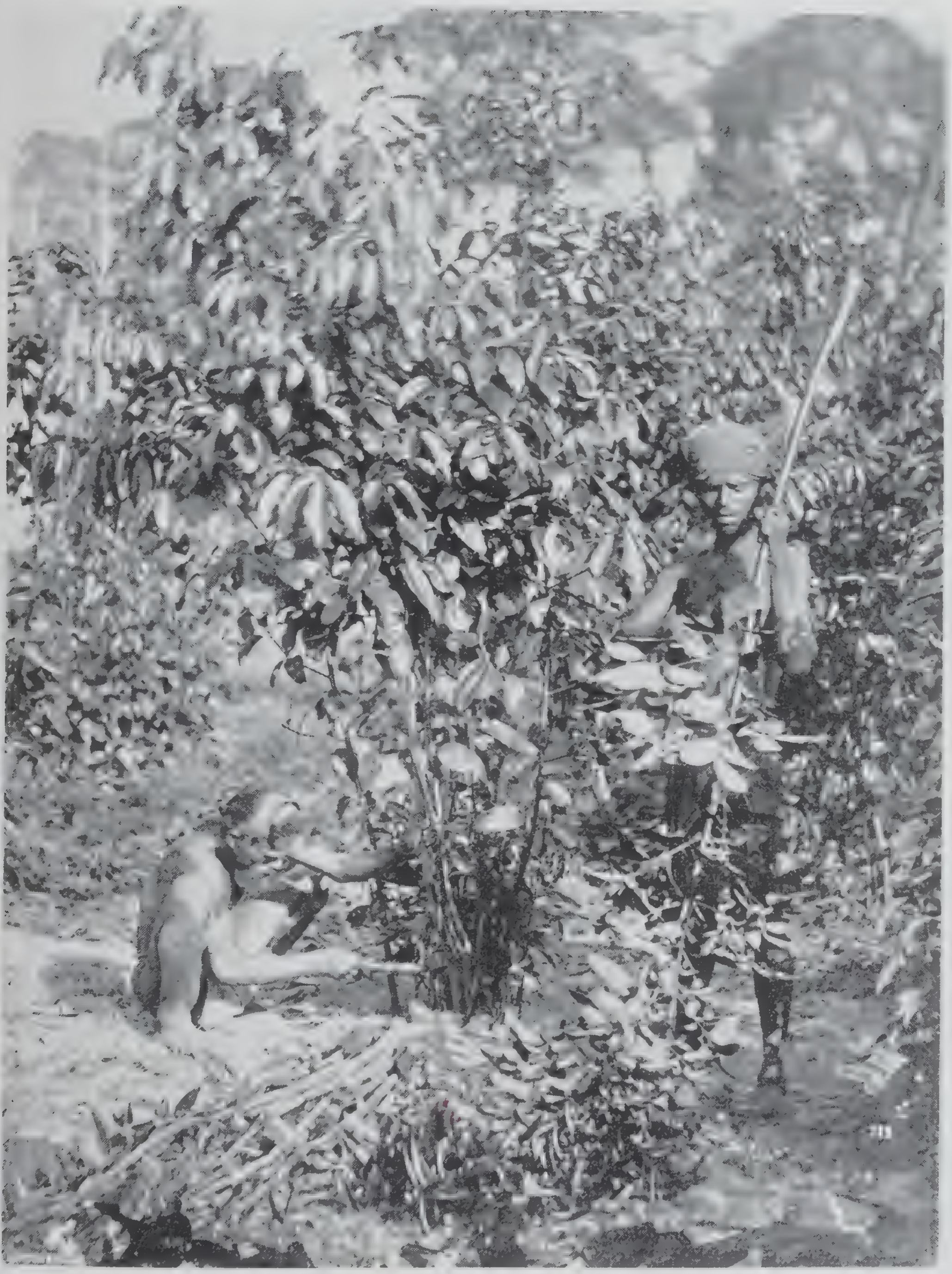

FIG. 133.—CINNAMON BUSH (CINNAMOMUM ZEYLANICUM): ONE YEAR'S GROWTH.

(To face page 376.)

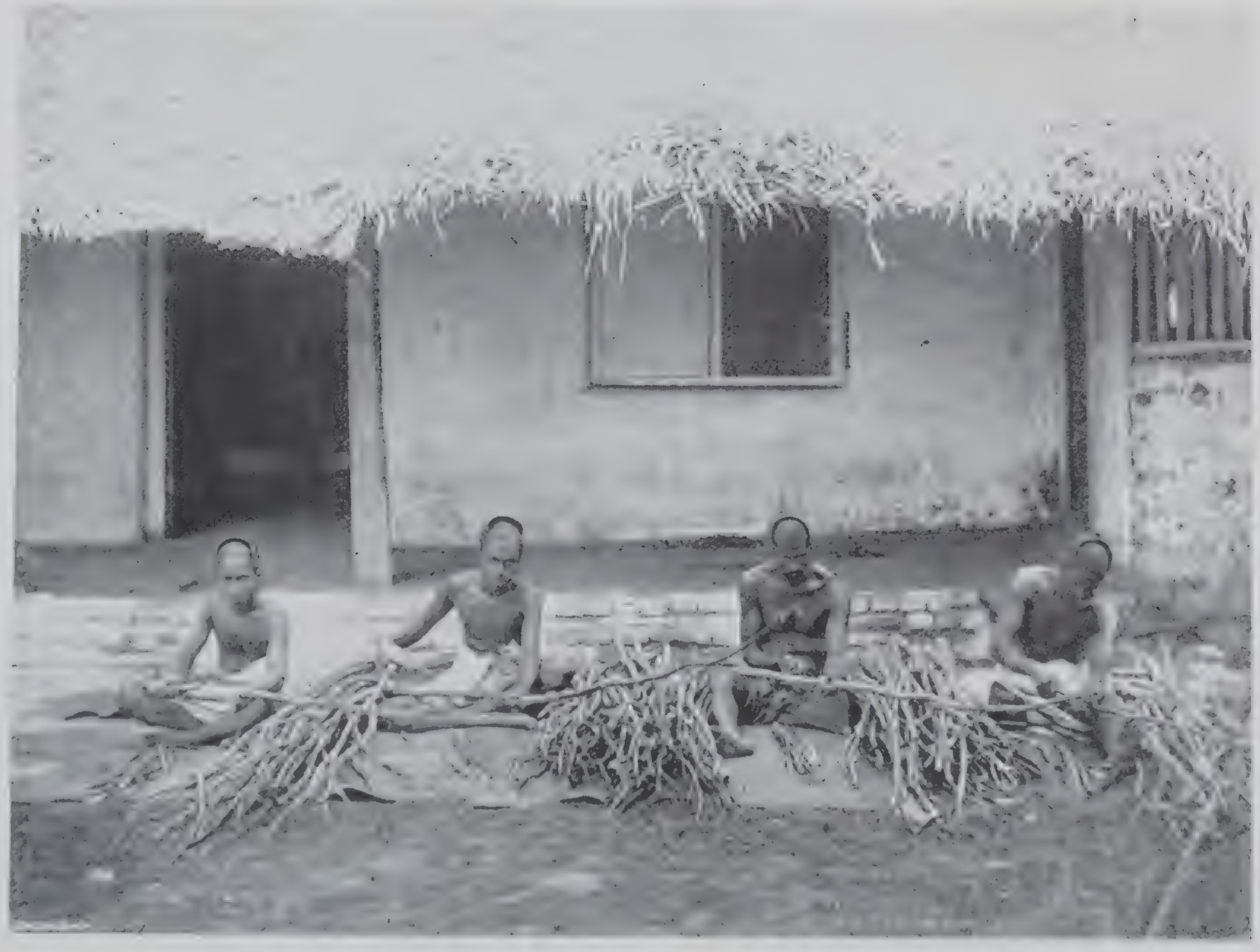

Fig 134. —Removing Bark from Cinnamon Canes.

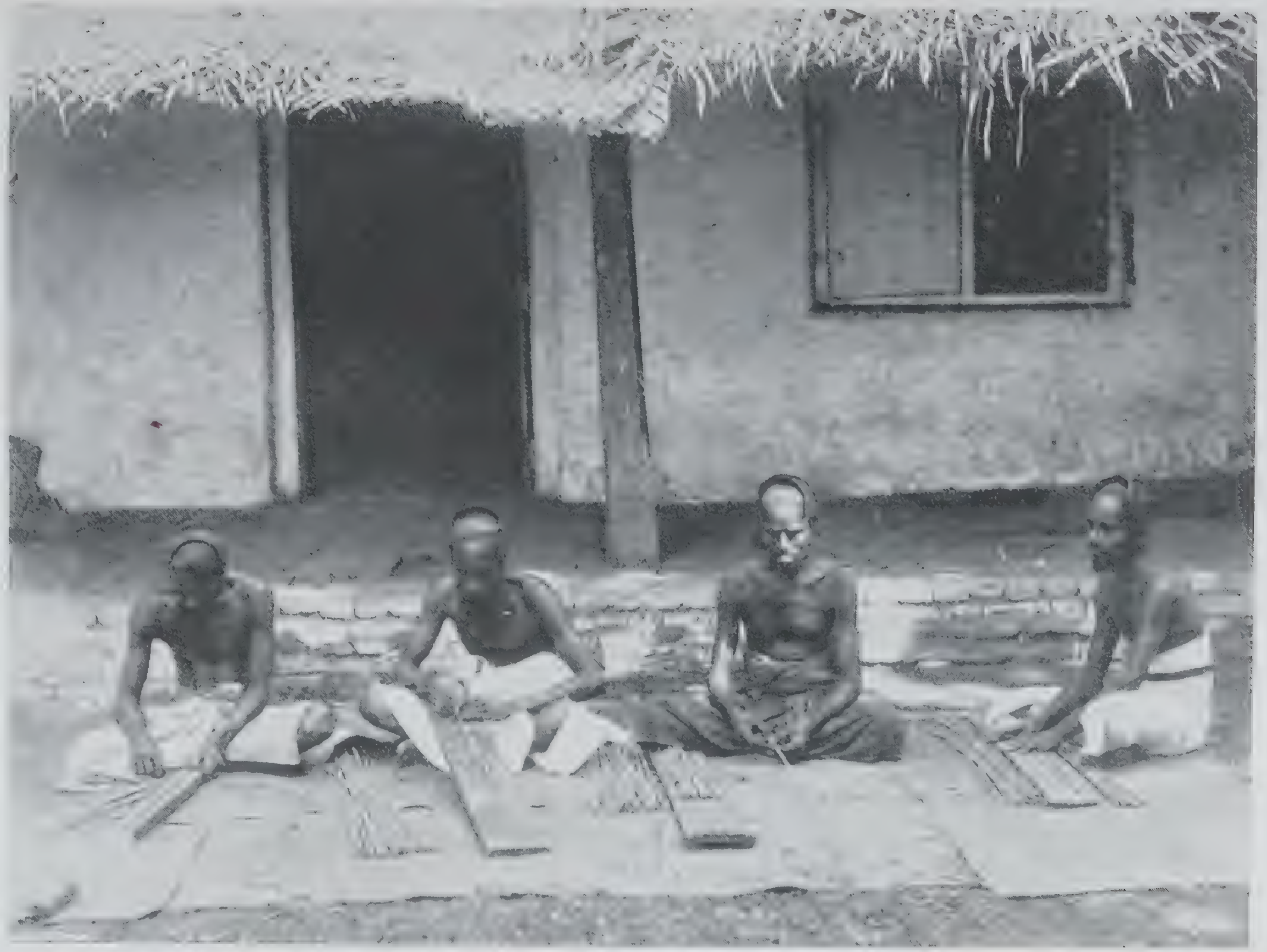

FIG. 135.—CINGALESE PREPARING CINNAMON QUILLS.

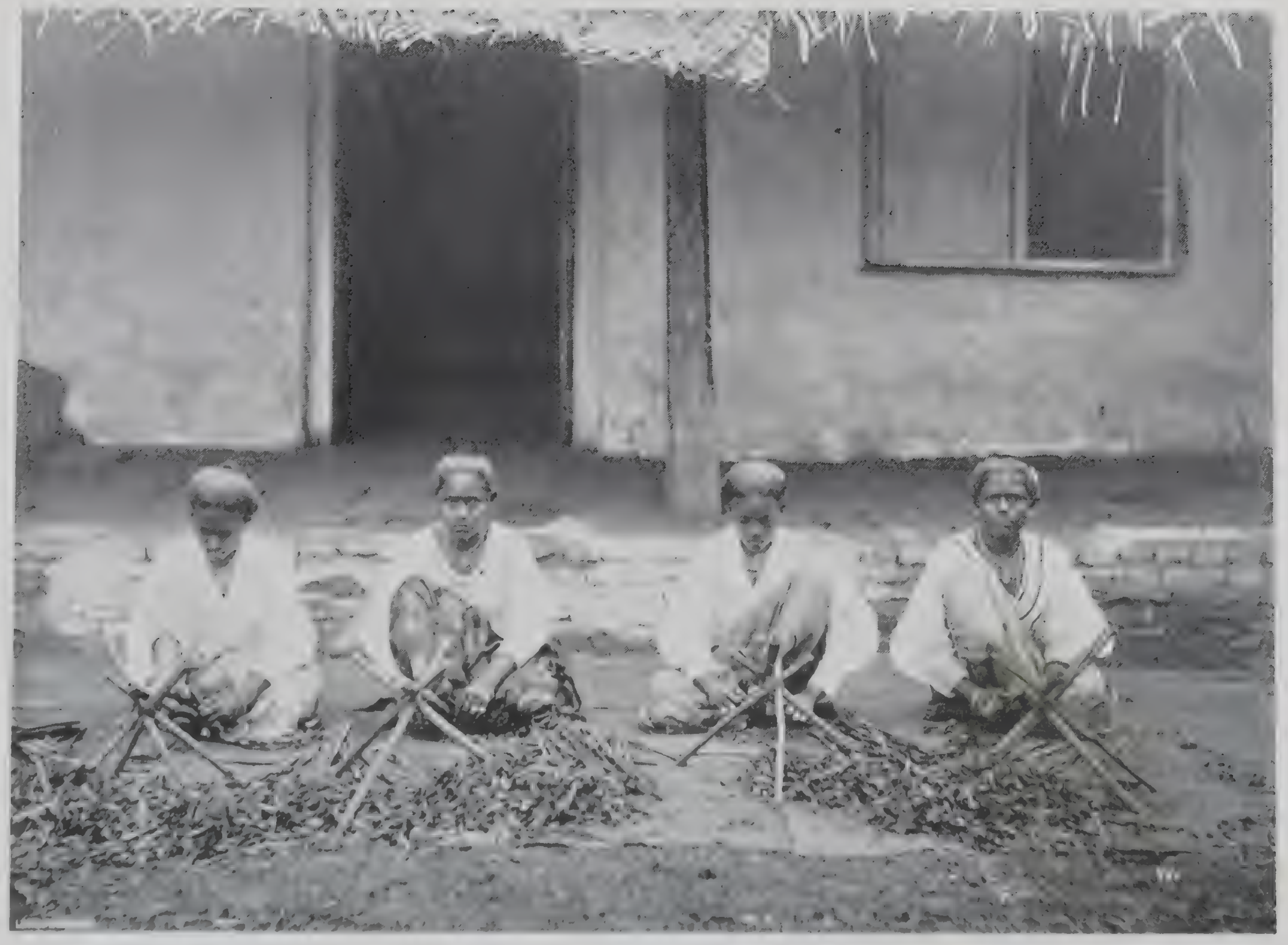

FIG. 136.—PREPARING CINNAMON CHIPS.

(*To face page* 175.)

VANILLA.

The sweet fragrance of the vanilla places it as one of the finest of our spices. In a humid tropical climate its culture is one of the most profitable. Mexico is its natural home, and in some seasons two million pounds are exported. Some intelligence and care are necessary in the management of the plants and the preparation of the fruit. The vines commence to bear in the third year, and continue for many years. It is partial to certain trees to grow upon, and prefers live stems to dead sticks. The Vanilla plant (fig. 132) is cultivated in many countries—Central and South America, Brazil, West Indies, Madagascar, Mauritius, India, Ceylon, Straits, and Java. In the forests of Venezuela it grows well. In the French colonies of Guadaloupe and Reunion the cultivation of Vanilla has added greatly to the wealth of the people. The total production of Vanilla is estimated at twelve million pounds. France, Spain, and Italy are the chief consumers and use it in perfumery and confectionery. Various decoctions are sold under the name of vanilla flavourings. When well cured the beans should have a fine chocolate colouring, and long beans, over nine inches in length, fetch 20*s.* a lb.

The Vanilla plant is propagated from cuttings, placed in a shady corner in sandy soil. To an office man living in any of our tropical towns, with a suitable piece of garden ground, and fond of a hobby, I can recommend vanilla culture as one of the most interesting and highly profitable. From such a garden I have known £150 in a season obtained from the crop. An instructive exhibit was made at one of the Society's shows this year of a fine sample of Vanilla, grown by an English gardener under glass.

In 1906 Mauritius exported 10,300 pounds, valued at Rs. 28,600, and the Seychelles, Vanilla to the value of Rs. 101,800.

MADAGASCAR CLOVE.

The cultivation of this profitable, easily grown evergreen tree is not so general as might be. As its name indicates, its cultivation has been almost entirely confined to Madagascar Island and the Zanzibar coast.

Nevertheless, it is gradually spreading over the East and becoming a very popular tree with the natives.

CINNAMON.

This (figs. 133-136) is one of our most important and one of the oldest and best known of our spices.

Cinnamum zeylanicum is the species that produces the true Cinnamon of commerce, and is cultivated in Java, India, Ceylon, Malay Islands, and elsewhere in the tropics.

About twenty-six species are known in India and Ceylon, some forming shrubby undergrowth, others large-sized trees, very ornamental and easily grown. The foliage, bark, and wood are highly odoriferous and are turned to domestic uses by the natives. From the dawn of historical records we must look to Ceylon as having supplied the markets of the world with Cinnamon bark and Cinnamon oil. It is stated that the

Romans communicated with India in the time of Augustus, investing the equivalent of £100,000 sterling in the trade. One of the most important articles from India was Cinnamon, and one writer states that £8 sterling per lb. was obtained in Rome.

In 1506, when the Portuguese landed in Ceylon, they found Cinnamon only in its wild state, growing in the forests adjoining the seaboard on the south and west. For their protection the Cingalese king contracted to pay an annual tribute of 25,000 lb. of Cinnamon. A present of 300 lb. of pepper and cinnamon was sent by the Kandian king to the King of Holland in A.D. 1602.

During the Portuguese and Dutch occupation of Ceylon Cinnamon was their chief source of wealth, collected from the low country and from the Kandian forests. There can be no doubt that Cinnamon is indigenous to Ceylon. One writer mentions Africa, but during my travels on that continent I have not found the least traces of Cinnamon in its natural state. The Dutch first commenced the cultivation of cinnamon in 1767 under Governor Falch, but the Cingalese looked upon such an undertaking with an evil eye. The Dutch Cinnamon gardens were formed to the extent of 15,000 acres at the chief village centres in the west and south of Colombo, from Negombo to Matara. Their highest export in one year reached 600,000 lb., and the prices ruled from 8*s.* to 17*s.* per lb. Dr. Roxburgh mentions that the first Cinnamon plantation was formed in Southern India from seed received from Ceylon in 1821. The first extensive planting of Cinnamon in Java was carried out by the Dutch in 1825; up to that period the monopoly of the trade rested with Ceylon. They continued to cultivate the gardens until 1844, when they were rented out to natives, or the lands sold outright. Up to 1846 there was a high export duty upon Cinnamon, from 1*s.* to 3*s.* per lb.; from 1848 to 1860 about 4*d.* per lb., when it became free. On removing the duty the exports suddenly reached one million pounds, causing a glut in the markets. For a number of succeeding years the output remained about half a million pounds.

Up to 1867 only quill bark had been exported, all the chips being used in the distillation of oil. Everything was then shipped, a great deal of it rubbish only fit for the furnace. This was an evil moment for the shippers, and brought great disfavour upon Ceylon Cinnamon, and many estates went out of cultivation.

In 1899 the exports of Cinnamon from Ceylon, quill and chips, exceeded 4½ million pounds. Last year the exports exceeded 6 million pounds, with 35,000 acres in cultivation. With such a large output the prices obtained can hardly be considered very remunerative. Europe is the principal market for Cinnamon, distributed as follows:—

United Kingdom . . .	half-million pounds.
Germany	two million pounds.
Holland	half-million pounds.
France	three-quarter million pounds.
Belgium	half-million pounds.
Spain	three-quarter million pounds.
Italy	half-million pounds.
U.S. America	one million pounds.

The Cingalese caste of cinnamon-peelers is distinct from the other castes, and its members are seldom found following other occupations in life.

The cultivation of Cinnamon is mostly confined to lowlands near the coast, though it will grow up to 2,000 feet above sea-level. The plant is partial to light sandy soil, and the best plantations are formed on a soil composed mainly of snowy white siliceous sand. Most of the native gardens are very closely planted, and almost a thicket at times. In forming a plantation it would be advisable to plant at a regular distance of six feet apart each way.

Propagation is by root division or by seed, and the ground should be kept free from weeds. For the proper working of the estate roads are a necessity, and must be formed according to the lay of the land, and drains cut where required.

Buildings are a simple item on a Cinnamon estate, only drying and packing sheds being required, as the owner generally lives on an adjoining estate.

The harvesting of Cinnamon bark goes on every year, but it is not an annual growth that is always ready to be cut down.

A profitable crop may be considered from 100 lb. to 120 lb. of good quill from an acre. All the chips are turned to good account by distillation into oil. Cinnamon oil is of great value, but can be severely adulterated into many forms; it is also one of the most powerful antiseptics known to the medical world.

Cinnamon oil last year was shipped, to the United Kingdom 174,000 oz., Belgium 4,300 oz., France 2,000 oz., Germany 100,000 oz., America 10,000 oz.; more than double the quantity of any previous year.

Cinnamomum Cassia (*Cassia lignea*), of China, has always been a rival to the Ceylon cinnamon, and no doubt is the spice brought from South China and the original cinnamon of the Mosaic and other early writings. The leaves have an exceedingly pleasant scent, and the export of this product from Canton has in some seasons been twelve million pounds.

China supplies the South American States, Peru, and Brazil.

CAMPHOR.

The camphor tree is a native of Formosa, China, and Japan, and attains to a height of about 40 feet; the wood, like all the other parts of the tree, is pervaded by camphor, and hence resists the attacks of insects. The well-known camphor is obtained by distilling or boiling the chopped wood or root; the subsequently condensed camphoric mass is subjected to a purifying sublimation process. It likes light, damp soil, and can be successfully grown from 2,000 to 5,000 feet above sea-level. Its cultivation has been rapidly extended in the East and West Indies and America.

The camphor tree is indigenous to the island of Formosa, covering the mountainous districts in the eastern portion.

The Camphor Bureau prohibits the cutting of trees under fifty years of age, but such control is difficult to regulate under savage tribes that still exist in these forests.

The Formosan Government annually exports six and a half million pounds of crude camphor and three million pounds of camphor oil. It is said 75 per cent. of the world's supply is produced in Formosa, leaving 25 per cent. to be produced from Japan and China.

A regular system of afforestation is being carried out by the Formosan Government, whereby a constant supply of raw material is secured for the future of the monopoly they have held for the last ten years. The camphor tree seeds freely, and the seed must be picked quickly when it becomes ripe, for it soon blows away. A wise course is adopted in setting aside in every forest a certain number of seed-bearers, which are protected. During the past ten years three million young trees have been planted, and a steady annual planting will go on.

There are two varieties of trees—and it requires an expert to detect the difference between these two varieties in the standing trees—the camphor-producing tree and the camphor-oil producing tree, the former of which is the more valuable.

Reports from Japan estimate the number of trees planted there during the past ten years at eight millions.

It is interesting to learn that the bulk of the world's camphor production goes into the manufacture of celluloid. Celluloid factories have been erected in Japan, and favourable terms are made every year with the Government for a supply of raw materials.

TURMERIC.

Turmeric is one of the very common plants grown by the natives in all tropical countries. The roots are pounded down and used in many ways; it is one of the chief ingredients in curry powder. It is a valuable colouring matter, and is used for tingeing chemical test paper. It is extensively used by the natives in dyeing their skin, and forms one of the necessary toilet requisites of the village maiden when performing her daily bath. Being an ornamental plant it is often cultivated in private gardens. The rhizome is still largely used by European dyers, especially by wool and silk dyers for the production of compound shades, olives, browns, &c. It gives a bright yellow colour without the aid of a mordant, but when mordants are used with it it yields other colours not unlike those obtainable from the yellow-woods.

GRAINS OF PARADISE.

More than one species of *Amomum* are turned to use, either in the seeds or tuberous roots. Grains of Paradise resemble the seeds of the Cardamom and has been known to the ancients; the seeds to the taste are agreeably aromatic.

Like all plants of this natural order they are fond of shade and moisture.

A. masticatorium Thw., as the name suggests, produces a sweet aromatic root, which is chewed with betel-leaf.

A. pterocarpum Thw., aromatic seeds in a sweet pulp.

A. aromaticum Roxb. is one of the common Indian species, and when the fruit ripens the capsules are carefully gathered by the natives

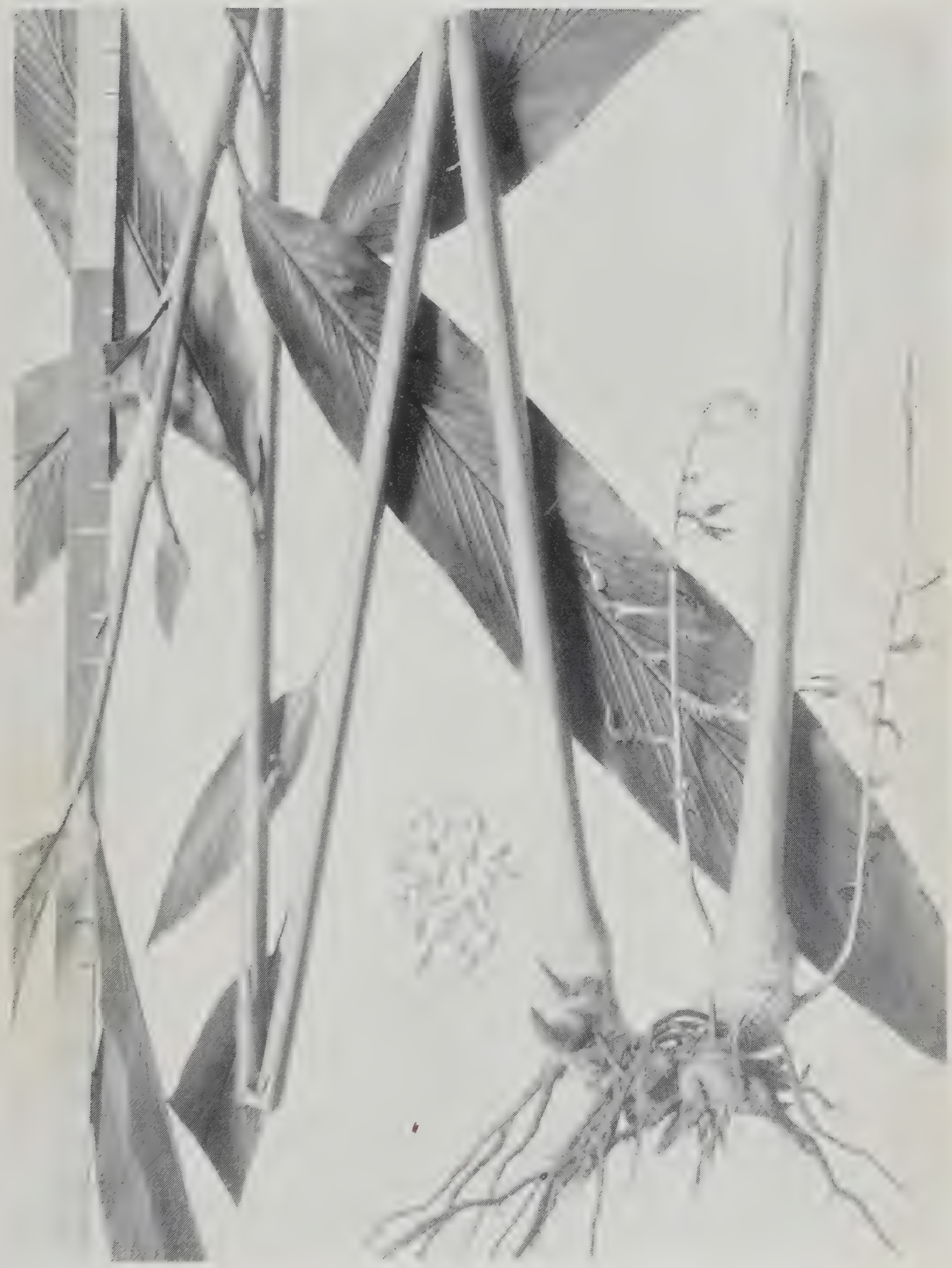

Fig. 137.—Cardamom (Elettaria Cardamomum), showing Stems, Leaves, Flowers, and Fruit.

(*To face page* 380.)

and sold to the druggists under the name of Cardamom. The Amomum has a wide distribution in the moist forests of many lands, generally in marshy ground or by river banks.

CARDAMOMS.

Cardamoms (fig. 137) form one of the finest spices that the world produces. The plant has a wide range from the West Indies, Eastern Archipelago, Java, Sumatra, Ceylon, India, Madagascar, and West Africa.

In the forests of Southern India it forms the chief undergrowth in certain provinces. The collecting of the Cardamom crop is rented out annually by the Government. Being a favourite spice, it is universally used in cakes, liqueurs, curries, and in medicine. The natives use it as a general condiment to their food, and it is likewise held in sacred estimation for the purposes of sacrifice. It is constantly chewed with betel-leaf. Mention is made by early writers that the Portuguese in the seventeenth century directed attention to the collecting and exporting of Cardamoms from India and Ceylon. The Dutch Government during their occupation of Ceylon fostered the industry in every way. Resulting from the failure of coffee in Ceylon, commencing in 1878, an impetus was given to the cultivation of Cardamoms in districts from 2,000 to 5,000 feet above sea-level. In preparing for Cardamom culture the larger forest trees are thinned out and all the undergrowth cleared away. The plants are inserted at distances ranging from 8 to 10 feet apart each way, and are propagated by division of the root clumps.

The success in some cases was very marked, and enormous yields were given for a few years. Prices were so high that an acre of Cardamoms produced as much as £300. With the increased area cultivated prices were soon reduced; still at 2*s*. per lb. an acre of Cardamoms will give a handsome profit to the cultivator.

It is a simple and interesting product to grow, and after the third year will go on cropping for many years. The collecting and drying of the fruit should be done in a regular manner. It is better to export in the capsule instead of the clean seed.

Elettaria Cardamomum is known as the Malabar variety and is more common in cultivation. The flowering racemes take a recumbent form, spreading round the plant.

Elettaria Cardamomum var. *major*, known as the Mysore variety, is possibly not such a heavy bearer, but the fruit is more aromatic, and the flowering racemes grow up right among the foliage of the plant. It is very difficult to arrive at an estimate of the annual crop that the world produces, so much is used in the countries where it is grown.

Customs returns show in some years 1½ million pounds.

The latest returns from Ceylon give 8,700 acres in cultivation, and the export is 732,136 lb., valued at 4*s*. per lb. More than half the exports go to India and the balance to Europe.

GINGER.

This plant is to be found over the tropical world, India and China being the largest exporters to European markets. The plant is productive in the warmer temperature zone, and gives satisfactory results.

For Candied Ginger only the young succulent roots are made use of. They are peeled and scalded prior to immersion in saccharine liquid. Great Britain imports annually about 70,000 cwt. of ginger, valued at £142,000.

Nearly a dozen species of *Zingiber* are known in the cultivated or wild state. The root is used for domestic or medicinal purposes. The plant luxuriates in rich, moist ground. The multiplication is effected by division of the root.

The Alpinias must be classed as Ginger-producing plants.

Alpinia Galanga and *A. officinarum* are the two plants producing the ginger of commerce so long exported from China and Japan.

Galanga roots have long been known in India for their aromatic and medicinal properties, and are often the chief ingredient in the concoctions of the native medicine-man.

They form an exceedingly showy class of plants.

Alpinia bracteata R. and *A. nutans* Rosc. have most beautiful flowers, and might even be considered gaudy.

However small a native's garden may be, a Ginger or Galanga plant is certain to be found, so great is his belief in its medicinal value. Owners of transport cattle always have suspended from the head of the cart a plant growing in an old fruit or meat tin.

In China and in Russia it is used in flavouring tea and liqueurs.

From Sierra Leone in 1906 Ginger to the value of £10,830 was exported, and from Jamaica in the same year £39,620 value. Our finest Ginger comes from the West Indies.

Citronella and Lemon Grasses.

Andropogon Calamus is the "Sweet Cane" and "Calamus" of Scripture. It is regarded as the aromatic reed of Dioscorides. From this species the ginger grass-oil of Nemsur, an article much used in perfumery, is distilled. It is the "Cusha" of India.

A. muricatus is the "Vitivert" or Kus-Kus grass, with a most delightful fragrance. The odorous Indian mats are made from the straw-like roots of this grass, used as awnings, tatties, covers, and screens in the dwelling-houses. During the very hot weather the screens are damped with water as they hang over the doorways, giving forth a cool and refreshing fragrance. A pleasant essence is distilled from the roots.

A. Martini is the true Citronella, or lemon-scented grass, from which a most powerful antiseptic oil is distilled. We must look to Ceylon for the supply, where the cultivation and preparation of this oil is entirely in native hands. Owing to a fall in the price the cultivation has declined in recent years, very much, I believe, through adulteration with kerosene oil. The means of detecting this adulteration is now known.

This grass is grown on the lowlands near the coast in the southern division of the island, and the total area under cultivation must approach 40,000 acres. Ceylon exports over one million pounds of Citronella oil, valued at ten shillings per lb.

According to general returns from cultivations two hundred and thirty pounds of grass will produce one pound of oil. A productive field of grass in its third year has given a yield of seventy pounds of oil per acre.

A. Nardus is also extensively grown for the distillation of oil. This grass was known as *Nardus indica* of the ancients. It is grown in Java, and has been introduced into the Seychelles and favourably reported upon for its large yield of leaves.

A. refractus, a perennial grass of Australia, is not eaten as fodder, on account of its scent, but is used extensively for mattresses. The root is very fragrant and contains a volatile oil of commercial value.

A. Schoenanthus.—Another abundant "Lemon Grass" of Southern Asia, Japan, and Australia, found in arid places. The medicinal Sirri oil is prepared from the root. The young leaf buds are used in curries.

A. flexuosus.—Malabar or Cochin Lemon Grass, found wild and now extensively cultivated over a good part of Southern India. The annual exports of Lemon Grass oil from Cochin is over 100,000 lb.

A. citratus.—This is the Lemon Grass of the Malay Peninsula, Java, Mauritius, and the Seychelles. It has long been grown in the Seychelles for its use in domestic medicine, having been introduced from Mauritius at the end of the eighteenth century. It has never flowered in the Seychelles. It is proved that grasses produce the largest amount of oil in the dry season. This grass has a wide range of the tropical world—found in Burma, Africa, Mexico, Brazil, New Guinea, and the West Indies.

ON PRUNING FRUIT TREES AFTER PLANTING.

By J. Lansdell, F.R.H.S.

The question of the pruning of fruit trees after planting is one in which I have taken great interest for many years.

After making experiments for several years, and closely observing what others have done, I have come to the conclusion set forth below as to the best time to prune newly planted trees.

I believe there is no doubt in the minds of gardeners that the best time to plant fruit trees is from the middle of October to the middle of November, because, by planting at that time, new roots may be formed before winter, and the soil gets so well settled down around them that the plants can start into growth in the spring, under almost equal conditions with those which have not been removed. Unfortunately, for various reasons, all planting cannot be done so early in the season.

If young trees such as our nurserymen are in the habit of sending out are planted at this time, I have no hesitation in saying that the pruning should be done the following spring just as the buds show some signs of moving, which with most trees is about the end of March. I would never prune in the autumn or winter immediately after planting. The reason for deferring the pruning until spring is that one can then see whether the buds to which he is pruning are sound wood buds. Because trees which have been removed, however short a distance they may have travelled, are very liable to have some of the outer buds on the shoots broken or injured, so that they do not start into such active growth as to make good leading shoots for future branches.

There appears to be another reason, but this I only throw out as a suggestion—that is, that the elaborated sap which is left in the shoots after the leaves have fallen may be gradually working into the buds for some considerable time after; and even may continue to do so, more or less, according to the temperature, throughout the winter.

Market gardeners in the Evesham district are continually planting out suckers from the Pershore Plum trees. Sometimes these are left until their stems are as thick as broomhandles, or even thicker, before they are dug up from the plant which produced them. As a rule, these suckers have three or four rather large roots, but not many fibrous ones. They are generally planted out in their permanent places and left unpruned for a year; for it is found that, if pruning is done the same season as the planting, a large proportion of them will die; but if they are left unpruned until a year after planting, it is seldom one dies. Why is this? I have come to the conclusion that the gradual storing of the sap after the fall of the leaf may account for the difference; and the cutting away of a large portion of the shoots may destroy the food which would have remained to sustain the plant until root action had commenced.

I can hardly think the loss of sap would be so much greater in a pruned tree than in an unpruned one, unless the 'bleeding' is very excessive from the ends where the shoots were pruned off.

Whatever the cause may be, it seems to me to have a distinct bearing on the pruning of newly planted trees in general; for, although the Plum trees referred to are exceptional, the effect is only in a less degree with trees having a better root system in proportion to their tops. I have had similar experience with apple and pear trees, some of which I have replanted after having been planted five or six years. They have been dug up very carefully so as to preserve as many of the roots as possible; and whenever the branches were pruned back at the time of planting, there was frequently more or less dying back; but I do not remember ever having any of the branches die back when no pruning was done at the time of planting, although I have had the trees remain dormant throughout one season.

Last season I planted thirty young Paradise stocks the stems of which were a little larger than a pencil, and which were large enough for grafting. I also planted some young Pershore plum stocks, all of which had been planted out the year before, and had very good fibrous roots, scarcely any of which had been broken in lifting. They were all planted in my own garden in good rich soil. A part of the Paradise, and a part of the plum stocks, were cut back to within nine inches of the soil, the last week in March. Those which were not cut down made strong shoots averaging three feet in length; I counted the leaves on one of the plum stocks and there were 146. I also counted the leaves on one of the pruned ones, and there were 54 leaves. The plants selected for counting appeared to be average ones in each case.

I also counted the leaves on two young bush apple trees which were planted last year in November. Both trees had twelve young shoots at the time of planting. One of the trees was pruned after planting, and at the end of September of this year it had 240 leaves. The other tree was left unpruned, and at the end of September it had 792 leaves, each of last year's buds having produced from three to five leaves, and each point had given a new shoot of about six inches long.

Possibly, there may be some who do not attach so much importance to the leaf system on a newly planted tree as I do; but it appears to me that the more leaves a tree has, and the earlier in the season these are produced, the more active the root will be, and the balance of the tree will be restored much more quickly than in one which has but few leaves to commence with. An unpruned tree produces nearly all its leaves at the beginning of the season, and these can at once work for the good of the tree, and for the formation of roots.

I think it might be taken as the rule that, when a tree is dug up, and the roots pruned ready for planting, not more than one-third of the original roots remains, and that the balance between the roots and top had been disturbed to that extent. I, as a gardener, was taught to attempt to restore the balance by pruning the shoots back after planting, either immediately after planting, or in the spring before the leaves burst; and I believe this theory is generally taught to other young gardeners. But, I ask, why restore the balance? Would it not be better for the tree to restore its own balance? From my own experience it is much better for the tree to do so. The part we want restored is the roots; and the tree will do this more effectively if all the shoots are left unpruned the first season so as to give a greater amount of leaf surface early in the season. The roots formed under these conditions are fibrous, which is just the sort desired. I have found that trees which were left unpruned the first season had many more fibrous roots than those which were pruned the first season, when both were lifted and replanted two years after.

I think we can safely say the balance will be restored the first season; then, if the shoots are all cut back to good wood buds, which will probably be within four or five inches of the base, good strong growths will be produced, which will lay the foundation for the future branches of the tree, and far superior to those on trees pruned the first year of planting.

For the last ten years I have seen a great number of fruit trees planted in the Evesham district, and I should think quite nine-tenths of them have not been pruned until a year after planting. I have asked some of the growers to prune a few the first season for comparison, but in no case have the trees done so well as those not pruned until a year after planting. These men judge by results; and when they have once proved a system to be best, no amount of literature will turn them.

I have been looking at some apple trees this week which were planted two years ago; some of them were planted in November, and the others in February, and all were pruned back in March of the same season. Those planted in November produced shoots from four to six inches long in the first season; at the most, only two shoots came out from each shoot cut back, but they have made fairly good growths this year. Those planted in February, and pruned in March following, made scarcely any growth, and not one has made six inches of growth this season; they are only about a third of the size of those planted in the November previous. There are other trees of the same variety which were planted at the same times, and in the same field, but were left unpruned for a year; and the growths of these trees this year are far superior to the best of those pruned the first year after planting, and there is no doubt about them making the best trees; the owner says no one will ever persuade him to prune again until the trees have been planted a year.

If small bush or pyramid trees are planted in private gardens, and are not wanted to make large trees, it would be better to prune them in the March following, because the less such trees grow, the more they are appreciated.

Where large pyramids, bushes, or standards are wanted, then by all means leave the pruning until the trees have been planted one year. For standards, this system is most important. As a rule, three-fourths of the original young shoot has to be cut away, so as to be sure of getting below all fruit buds. The usual advice is to cut to an outer wood bud, which of course is the right thing to do, if you have enough shoots already on the tree; but do not think this should be a fixed rule, because it often happens that two leading shoots are required where there is only one now; in such cases I advise the two top buds should be one on each side of the shoot, neither of which is an outside or an inside bud.

Small bush fruits, such as gooseberries and currants, may be pruned in the spring after planting, because a smaller proportion of the roots are destroyed in digging them up.

Roses may also be pruned in the spring after being planted, because they are practically evergreens, and in their case roots are more or less active throughout the winter, and there is no comparison between them and a real deciduous tree.

The system of pruning I have advocated in this note has been practised for some years, and I have simply given some of the facts of my experience and observations with the hope it will be tried by others.

REPORT OF THE SOCIETY'S CONSULTING CHEMIST FOR 1909.

By Dr. J. A. Voelcker, M.A., F.I.C., F.L.S.

In the course of the year 1909, six samples were submitted to me by Fellows of the Society for analysis. These comprised one manure (bone meal), one water, and four samples of soil.

Bone Meal.

This was submitted by a Fellow residing in Cornwall, who thought it looked different from what he had been in the habit of getting. It cost £5 12*s*. 6*d*. ex-warehouse. The analysis was as follows :—

	Per cent.
Moisture	8·56
* Organic matter	36·85
† Phosphoric acid	20·61
Lime	27·32
Oxide of iron, magnesia, &c.	4·31
Sand	2·35
	100·00
* Containing nitrogen	4·71
Equal to ammonia	5·72
† Equal to tribasic phosphate of lime	45·03

Though certainly a rather dirty-looking sample, this was one of genuine bone meal and of good quality. The price was quite reasonable.

Soils.

These, as usual, formed the largest and most interesting part of the work done, and points that may be of value are briefly noted in each case.

(a) *Soil for Narcissus Growing.*—This came from near Bletchley, Bucks, and was garden soil of a property which the Fellow in question contemplated purchasing, and where he intended growing Narcissi.

The analysis was as follows :—

	Soil dried at 212° F. Per cent.
* Organic matter and loss on heating	5·42
Oxide of iron	5·03
Alumina	3·72
Lime	·76
Magnesia	·36
Potash	·29
Soda	·25
Phosphoric acid	·20
Sulphuric acid	·07
Insoluble siliceous matter	83·90
	100·00
* Containing nitrogen	·209

The soil was somewhat gritty in character, but was, generally speaking, in fair condition, and not markedly lacking in any necessary ingredient of fertility. When regarded from the point of view of growing Narcissi, it would seem desirable that on such a soil the amount of vegetable (organic) matter should be increased, and this might be done by the use of farmyard manure, leaf mould, and other vegetable matter. It is well, however, to remember that *fresh* farmyard manure ought not to be used in such a case, but it is advisable to put this on for the crop preceding the growing of Narcissi. Though potash was present in fair amount, the further addition of this by the use of sulphate of potash would also probably be desirable. Inquiry elicited the information that the drainage was satisfactory, and this is a very material matter in the growing of Narcissi, as if there is risk of water remaining stagnant this would be detrimental to successful cultivation.

(b) *Soil for Vine Border.*—A sample was sent from a vine border, where it was thought that the young vines were not growing satisfactorily. The analysis of this soil was as follows :—

	Soil dried at 212° F. Per cent.
* Organic matter and loss on heating	8·28
Oxide of iron and alumina	5·29
Lime	·96
Phosphoric acid	·50
Magnesia, alkalies, &c.	·28
Insoluble siliceous matter	84·69
	100·00
* Containing nitrogen	·369

On the whole, the soil was not at all a bad one, and its physical condition was satisfactory. Though for ordinary agricultural purposes the amount of lime may be considered ample, yet for vine-growing the further use of lime is to be recommended.

Owing to the fact that only a partial analysis was asked for, the actual amount of potash in the soil was not determined. It is clear to me from the analysis, however, that potash existed in but small amount, and for vine-growing the further use of potash salts is to be recommended.

(c) *Soil for Flower Growing.*—This came from the neighbourhood of Oxford, and the analysis was as follows :—

	Soil dried at 212° F. Per cent.
* Organic matter and loss on heating	6·04
Oxide of iron	10·22
Alumina	2·73
Lime	1·66
Magnesia	·40
Potash	·29
Soda	·32
Sulphuric acid	·10
Phosphoric acid	·50
Insoluble siliceous matter	77·74
	100·00
* Containing nitrogen	·224

The deficiencies of this soil consisted mainly in the organic matter and nitrogen contained, as also in the potash, the quantity of the last being small for successful plant-growing. The soil, moreover, was of a light gritty character, and what is really needed for such soils is to import more "substance" into them. This could be done by mixing with the soil other of heavier character, while the combination of this with farmyard or stable manure would, at the same time, increase the organic matter and nitrogen. Such mixing of soil, while impossible in the case of agricultural land, is frequently quite feasible when garden soil is in question.

(d) The remaining inquiry as to soils did not involve an analysis, but related to the suitability of land for the purpose of forming a lawn, and advice regarding this was given.

GENERAL.

In addition to the above there were several matters of inquiry and general consultation, such as the use of the new inoculating material "Nitro-Bacterine," the employment of basic slag, and other manurial materials.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

VIII. Inoculation of Garden Crops.

By F. J. Chittenden, F.L.S.

Further trials with Nitro-Bacterine were carried out during the past season, in continuation of those of 1908, reported in the Journal, vol. xxxiv. pp. 231–254, and pp. 491–497.

Instead of peas, French beans were used for the experiment with leguminous crops, the variety grown being 'Canadian Wonder,' the seed being kindly presented for the purpose by Messrs. Sutton, of Reading.

The Soil of the Experimental Plot.—The site chosen for the experiment was one adjoining the "fallowed land" experiment of 1908. It was very sandy, extremely poor in organic matter, and contained only traces of lime. It had lain fallow for several years, and the only cultivation it had received until 1909 was horse-hoeing, to suppress weeds. The general nature of the soil is fully dealt with in the previous report, to which reference should be made (xxxiv. pp. 237–240).

Preparation of the Ground.—The plot received a thorough dressing of powdered chalk, as Professor Bottomley reported that the best results had been obtained where chalk had been applied previous to the inoculation. It was then bastard trenched, so as to ensure as free a root run as possible. No manuring was attempted, and from this point of view the trial was far less complete than that carried out in 1908; but the results obtained then indicated that under no system of manuring was any benefit due to inoculation with Nitro-Bacterine to be obtained in our soil.

Plan of the Experiment.—The ground occupied by the experiment measured 141 feet by 36 feet, and was divided into fifteen plots, each measuring 8 feet by 36 feet, separated from one another by paths measuring 1 foot 6 inches in width (see plan, fig. 138). The ground had a slight slope from south to north, and, as was the case in 1908, on the fallowed ground the crops fell off greatly from the lower (north) end to the upper, and probably for the same reason. (See Journal, xxxiv. p. 238.)

On each plot two rows of seeds were sown, running from east to west. The same weight of seed was sown in each of the rows (125 grammes), and the seedlings were thinned out later to fifty in a row.

The soil of plots 1–7, 11, and 15 was not inoculated; that of plots 8–14 was.

The seed used on six plots, viz. 4, 5, 6, and 12, 13, 14, after weighing, was inoculated by dipping in the turbid Nitro-Bacterine culture, prepared exactly according to the directions given on the packets; and the uninoculated seed was dipped in tap-water for the same length of time, in order to ensure that if any ill effect followed the moistening of the seed all alike should be subject to it. The dipping in each case was only sufficiently long to ensure that the seed coats should be thoroughly wetted. The seed was subsequently dried in a darkened room before being sown.

After the plants had developed they were all watered, as shown in Table A and at fig. 138—some with Nitro-Bacterine, some with the solution of sugar and salts used in making the culture, and the rest with pure water.

Inoculation Material.—The material used for the inoculation was kindly presented by Professor Bottomley, and was received from him direct. The material containing the germs consisted of a small quantity of dry cotton wool, together with a considerable amount of sand and dry organic matter, including dead leaves of sphagnum and other mosses. The other packets were similar in composition to those sent in 1908. The culture was started on May 17, and used on May 19, the soil being inoculated and spread on that day, and well hoed in, and the seed being sown on the next day as soon as dry.

Growth of the Plants.—The seed germinated quickly and well, and there was no noticeable difference in the rate of germination between the inoculated and the untreated seed and soil.

Many of the seedlings were attacked and destroyed by the larva of a small dipterous fly (species not identified, but apparently nearly related to the one that attacks peas in the same way). The larva bores into the root and upwards into the stem; the latter turns brown and dies. All plots alike suffered, but about 100 plants came safely in each row, and these were thinned to fifty, as equal in size as possible. The plants grew slowly, and never developed well; they reached the fruiting stage during the hot dry spell of weather in August, and did not grow after, so that the crops were very small throughout.

The pods were gathered when of a marketable size, and the plants were picked over twice. The results are set out in the table below.

TABLE A.

Plot	Soil treatment	Seed treatment	Subsequently watered with	Weight of produce	No. of inoculations
1	Not inoculated	Not inoculated	Well water	1,108 grs.	0
2	,, ,,	,, ,,	Solution of salts and sugar	872 ,,	0
3	,, ,,	,, ,,	Nitro-bacterine culture	760 ,,	1
4	,, ,,	Inoculated	Well water	880 ,,	1
5	,, ,,	,,	Solution of salts and sugar	932 ,,	1
6	,, ,,	,,	Nitro-bacterine culture	773 ,,	2
7	,, ,,	Not inoculated	Well water	731 ,,	0
8	Inoculated	,, ,,	,,	712 ,,	1
9	,,	,, ,,	Solution of salts and sugar	650 ,,	1
10	,,	,, ,,	Nitro-bacterine culture	803 ,,	2
11	Not inoculated	,, ,,	Solution of salts and sugar	609 ,,	0
12	Inoculated	Inoculated	Well water	636 ,,	2
13	,,	,,	Solution of salts and sugar	697 ,,	2
14	,,	,,	Nitro-bacterine culture	666 ,,	3
15	Not inoculated	Not inoculated	Well water	591 ,,	0

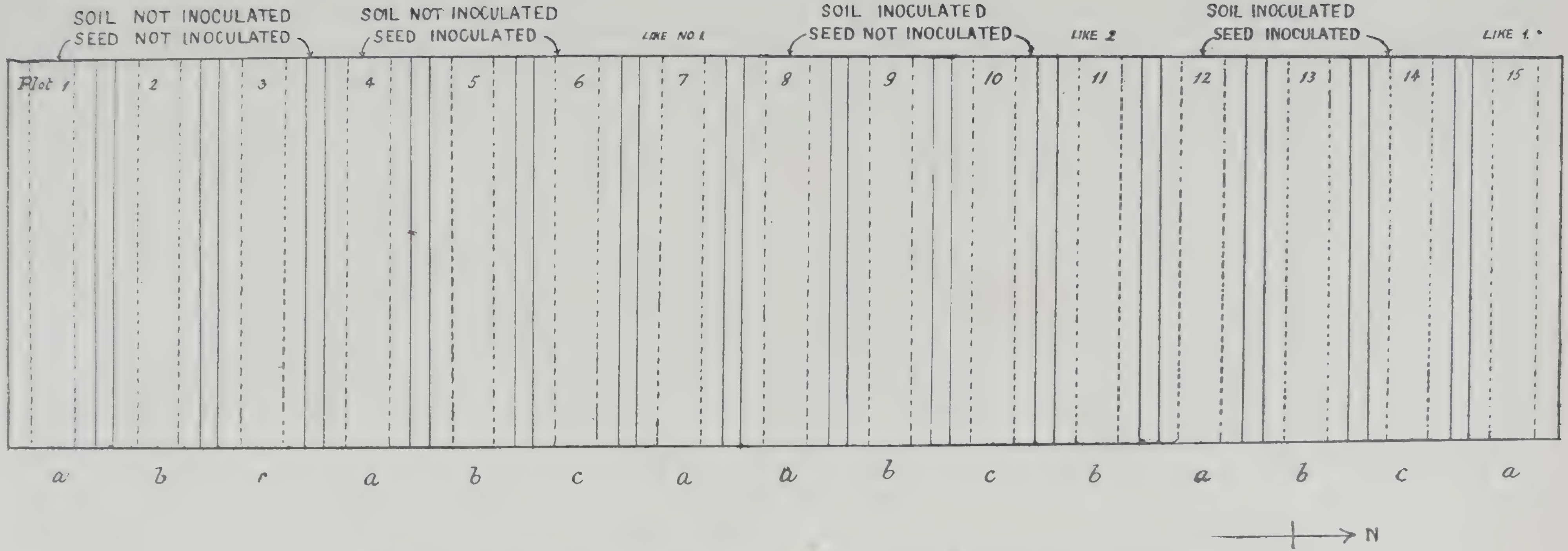

FIG. 138.—PLAN OF PLOTS FOR TRIAL OF INOCULATION OF FRENCH BEANS AT WISLEY, 1909.

Plots marked "*a*" were watered with well water when the plants were well grown; those marked "*b*" with the solution of salts and sugar used in making the culture; and those marked "*c*" with the "Nitro-bacterine" culture itself.

[*To face p.* 392.

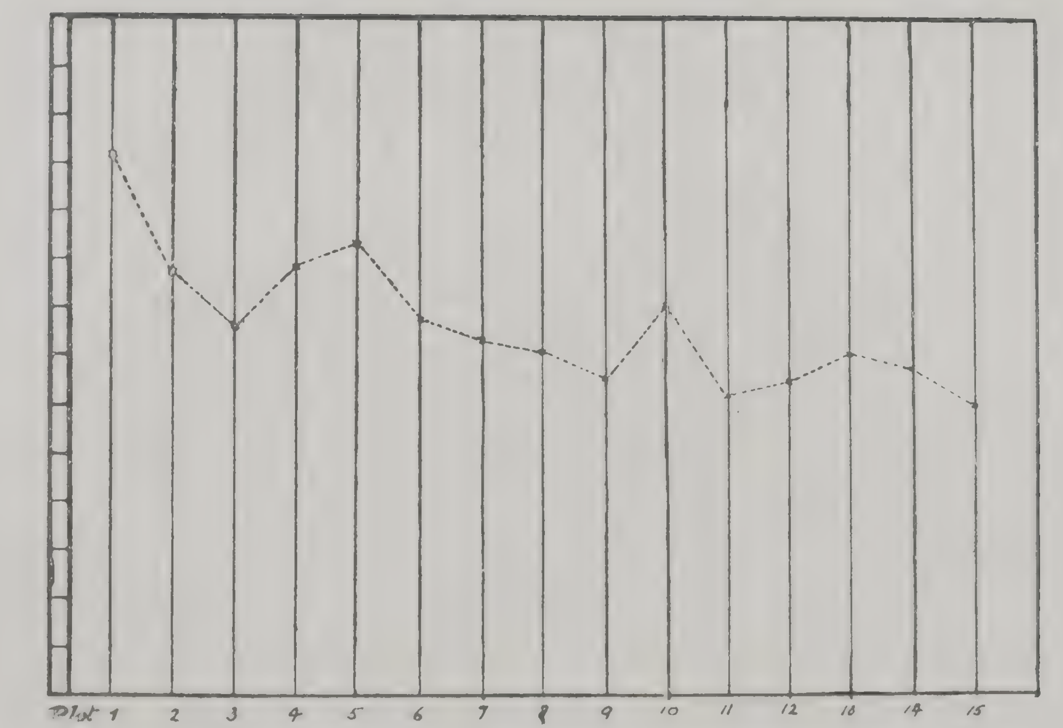

Fig. 139.—Diagram showing the Comparative Yields from the several Plots in the Trial of "Nitro-bacterine" with French Beans, 1909.

(*To face p. 393.*)

The plants on all the plots were well supplied with nodules, and there was no noticeable difference in the number of nodules on those inoculated as compared with those that were not.

The results as set forth above call for little comment. They are obviously not in favour of inoculation, but taking into consideration the results of plots 1, 7, and 15, which received similar treatment, as did 2 and 11, which show a gradual falling off from one end of the ground to the other (fig. 139), it is equally plain that the reduction of crop which characterizes the plots towards the southern end cannot be attributed to inoculation.

A comparison of the yields of the plots which were inoculated with those which were not (which included the largest and the smallest crops) is instructive in this connexion.

TABLE B.

Treatment	Average yield
Not inoculated.	
Plots 1, 2, 7, 11, 15	782 grs.
Inoculated once.	
Plots 3, 4, 5, 8, 9	787 grs.
Inoculated twice.	
Plots 6, 10, 12, 13	727 grs.
Inoculated three times.	
Plot 14	666 grs.

These averages show that the diminution of the crop was due rather to the position of the plots than to the inoculation.

A series of cultures made in pots with the same soil showed similar results.

WIDE DISTRIBUTION OF THE NODULE BACTERIA.

In connexion with the question of soil inoculation for leguminous plants it seemed of some interest to find to what extent organisms capable of forming nodules on peas and beans were distributed in the soils in various parts of the Wisley Garden and in a few other places on different formations. The results of these tests are shown in Table C below.

In order to minimize the risk of contamination with bacteria from other sources as far as possible, the soil (so far as the Wisley soils are concerned) was dug out with spades thoroughly washed with a solution of mercuric bichloride and carried to the Laboratory in clean boxes. It was then placed in pots that had been washed and kept after crocking in steam at 98° C. for an hour, care being taken that the soils were not mixed. The seeds were soaked for half an hour in carbon bisulphide to kill any adherent bacteria, and then, as soon as the disinfectant had evaporated, they were sown in the pots prepared for them. The pots were covered with cotton wool and they were watered with water recently boiled. The cultivations were made in duplicate. Precipitated chalk was added to the soils which were poor in lime.

TABLE C.

In the fifth column B = Broad Beans ; P = Peas ; F. B. = French Beans.

Culture	Locality from which soil came	State of land from which it came	Character of soil	Seeds sown	Relative number of nodules
100 101	Llandudno, N. Wales	Garden	Very sandy, little humus	B.	Several
				P.	,,
				F. B.	,,
102 103	Rudgwick, Sussex	Pasture	Clay loam	B.	,,
				P.	,,
				F. B.	Few
104 105	Wisley Common, Surrey	Heath with heather	Peaty sand	B.	Several
				P.	,,
				F. B.	,,
106 107	Wisley Garden Howard's, N. end	Pasture	Sand	B.	,,
				P.	,,
				F. B.	,,
108 109	Wisley Garden Pinetum, N. end	Rough grass	,,	B.	,,
				P.	,,
				F. B.	None
110 111	Wisley Garden Pinetum, S. end	,, ,,	Sandy peat	B.	Several
				P.	,,
				F. B.	Few
112 113	Wisley Garden Pine wood	Grass with trees	Sand	B.	Several
				P.	None
				F. B.	Several
114 115	Wisley Garden Howard's, S.W. corner	Pasture	,,	B.	,,
				P.	,,
				F. B.	,,
116 117	Wisley Garden Vineyard	Cultivated	Medium loam	B.	,,
				F. B.	,,
118 119	Wisley Garden Wild garden	Grassy hill-side	Sand and leaf soil	P.	,,
				F. B.	None
120 121	Wisley Garden Seven Acres, W. end	Pasture	Alluvium	P.	Several
				F. B.	Few
122 123	Wisley Garden Orchard	Cultivated	Light loam	F. B.	Several
124 125	Wisley Garden Pine wood	Grass with trees	Sand	P.	,,
				F. B.	,,
126 127	Wisley Garden Howard's, S.E. end	Pasture	,,	F. B.	,,
128 129	Wisley Garden Seven Acres, E. end	Pasture	Alluvium	P.	,,
				F. B.	Few
130 131	Wisley Garden Wild garden	Oak wood	Leaf mould	P.	Several
				F. B.	,,
132 133	*Seaford, Sussex	Arable	Clay	P.	,,
				F. B.	Few
134 135	* ,, ,,	,,	Calcareous clay	B.	,,
				P.	Several
136 137	* ,, ,,	Pasture	Alluvium sometimes inundated with tidal water	B.	Very few
				P.	,,
138 139	* ,, ,,	Pasture	Chalk down	B.	,,
				P.	None
140 141	Stanmore, Middlesex	Rough land	Clay	B.	Several
				P.	,,
142 143	,, ,,	Garden	Clay loam	P.	,,
				F. B.	,,
144 145	*Pulborough, Sussex	Arable	,, ,,	P.	Few
				F. B.	None
146 147	* ,, ,,	Pasture	,, ,,	P.	Several
				F. B.	Few

* These were afterwards well watered with some of the Nitro-bacterine culture for French beans and sown with a fresh lot of seeds. Nodules developed abundantly on the resulting plants.

The organisms are thus widely distributed in the Wisley soils and exist in places where it seems difficult to account for their presence, *e.g.* in cultures Nos. 104 and 105. This only bears out observations made in gardens and fields, where it is extremely rare to find leguminous plants without nodules. The French beans lacked nodules more frequently than the other plants, but in all the land that had been under cultivation they were found.

INOCULATION OF NON-LEGUMINOUS CROPS.

Both in 1908 and 1909 attempts were made to test the influence of Nitro-Bacterine when used for non-leguminous crops.

In 1908 cabbages and lettuce, and in 1909, beet and tomatos were planted on the poor fallowed land treated with powdered chalk, some being inoculated and some not, but in no case was satisfactory growth made. The inoculation was evidently incapable of overcoming the poverty of the soil, and apparently of supplying nitrogen to the plants put into it so as to enable them to grow properly. Further, in 1909, the culture failed to become very cloudy within the forty-eight hours although kept under the very best conditions for development, indicating that it was at least weak, and showed itself to be contaminated with considerable numbers of organisms other than nitrifying ones.

In the case of the tomato, the individual differences between the plants was so great as to render any comparison between the growth in the adjacent rows of very doubtful value.

Radishes were grown in pots under glass in the same poor soil and supplied with lime. Under these conditions the inoculated plants gave a yield about equal to that of the uninoculated.

It may be added that manuring with nitrogenous manures such as nitrate of soda and nitrate of lime resulted in obtaining average crops of both turnips and radishes in this soil.

COMMONPLACE NOTES.

By the Secretary, Superintendent, and Editor.

Budding Mangos.

Mangos are plants notoriously difficult to propagate by budding or grafting, inarching being the most commonly practised method of propagation. Mr. Hugh Dixson, F.R.H.S., of Sydney, New South Wales, who is growing mangos and custard apples as wall fruits, in the course of a communication refers to a method of budding which has proved successful, and which will doubtless be of interest to others who are attempting the cultivation of this fruit.

He sends the following extract from a letter received from Mr. A. H. Benson, instructor in Fruit Culture of the Department of Agriculture and Stock, Brisbane :—

"In regard to the plate budding of mangos, I have to inform you that this method of working the mango is a very simple one, and is carried out when the tree is in full growth : that is to say, when the sap is moving freely and the bark parts readily from the wood.

"The buds used are the dormant buds that are found on the older branches of the tree, 1½ inch or more in diameter, where there has been a terminal growth. This is shown by a ring round the branch even though it is several years old. The dormant bud, together with the bark surrounding it, some two inches square, is removed from the tree that it is desired to propagate. The edges are carefully trimmed and a corresponding square of bark is taken out of the tree that is to be worked over, and the piece of bark containing the dormant bud fitted into the space so left.

"Success depends on the stock being in the right condition, viz. that the bark runs very freely ; that the bark containing the bud is rather thicker than that of the stock, and that this bark is tied very firmly in place so that the inner bark joins perfectly ; good cotton wick is the best tie. As soon as the bud is fitted into position and fairly tied, the branch or tree above the insertion of the bud is ring-barked, so that the sap of the tree is forced into the bud, which will then quickly unite with the tree. One or more buds can be inserted in the same tree and several varieties of mangos can thus be grown on the same stock."

Luculia gratissima.

Lieut-Col. Rippon, F.R.H.S., writing from the South Shan States gives the following notes concerning the beautiful *Luculia gratissima*, which no doubt cultivators of it will appreciate : "Luculia grows up to 6,000 feet in the Kochin Hills near Bhamo, and I have seen small plants growing in the moss on otherwise bare rocks in the Bhamo Hills. The rainfall there is over 100 inches annually. There is little lime there, but mostly granite. Here (at Kalan), on the other hand, the soil is full of lime and the hills are mostly limestone. The seed, which takes eighteen months to ripen, comes up very freely with me. It was sown broadcast on two beds of light soil which was full of lime (effervescing freely with acid). The beds were 4 feet by 25 feet, and the plants came up so thickly that the bed was a mass of green in about six weeks. This place is about 4,500 feet above sea level and at the time of sowing, April and May, the temperatures in the shade are—maximum 82° and minimum 60°–61° ; the average maximum for the two months, 76°, the average minimum 63°, and the minimum on the grass 54°. The April rainfall amounted to 5·39 inches, that of May to 7·72 inches. Luculia flowers in the Kochin Hills in September, but here, in the first year, with a deficient rainfall, it did not flower till December ; this year, with a heavier rainfall, it is flowering in September.

The young shoots were cut slightly by frost here on the flat last year, when the minimum on the grass was 26°."

VANDA COERULEA.

The same Fellow says concerning this well-known orchid, "*Vanda coerulea* grows here (at Kalan) on several species of trees from 10 feet to 40 feet above the ground, in my experience. As a general rule, the rainfall averages about 45 inches and falls from the middle of April to the end of September fairly regularly. Some heavy showers come in October, and, generally, a wet spell of a few days in either November or December.

Vanda flowers from the end of July to late in September. It seeds freely and likes its roots to be in the shade, while the flower spike frequently finds its way outside the foliage of the tree where there is a gap. Too much shade makes the flowers very pale. The roots grow to two feet or more in length and adhere closely to the bark of the trees. It does not appear to mind whether the wood is dead or not. I think some of these fleshy-rooted orchids suffer at home from their roots being confined and (generally) kept wet. Out here, tied to a bit of the trunk of a tree or thick branch, they grow to perfection. This year I had a dead branch about 3 feet 6 inches long with fourteen sprays out at one time. This of course is exceptional and is the best I have ever seen. When not flowering the branch is fastened up perpendicularly, or nearly so, so that the sprays pointing upwards are shown off well when brought inside the house."

A SUGGESTION FOR LOCAL SHOW COMMITTEES.

From a correspondent we have received a copy of a letter written by Mr. Thomas Canning, of Liscard, Cheshire, containing a somewhat novel suggestion which we commend to the consideration of the Committees of Local Horticultural Shows, Associations of Allotment Holders, Local Education Committees, and the like. Although there might possibly be some difficulty in getting suitable vacant land at the season of the usual summer shows, yet it is probable that at other seasons such land could be obtained easily and that such a competition would meet with at least as great a measure of success as attends ploughing matches, and at the same time would tend to improve the most important horticultural operation to the benefit of gardens and profit of gardeners all through the district. The conditions of the competition are capable of considerable variation according to local requirements. Mr. Canning writes as follows :

"One acre of good land, with a cottage upon it and a market near, could, I am convinced, give employment all the year round to one man, and this would go a long way towards solving the unemployed problem.

"But such men would have to be expert in the use of the spade, which is without doubt the best implement ever invented for the cultivation of the soil.

"By skilful handling of this implement the land might be made to yield three good crops, viz. spring, summer, and autumn ; and if young men could be induced to devote the same time and attention to the use of the spade as is now given to games of football and other unremunerative sports the same proficiency could be obtained with quite as much enjoyment to themselves, and much more profit both to themselves and the nation.

"Why not select eleven men a side to form spade-teams, and to engage in digging competitions ? Why not have land properly measured and roped off into sections, invite the public, and charge gate money for admission, to watch contests in which each man does his best to till his section of soil in the shortest possible time and in the best possible manner so as to leave the land in the best condition ?

"Wherever Garden Cities or Allotments are in existence, or Agricultural and Flower Shows flourish, training in the use of the spade could not be out of place, and digging competitions might be organized. And surely they would prove of great and lasting benefit to the health and physique of our race, as well as favourable to the food supply of the nation.

"Old as I am (and I shall soon reach my eightieth year) I would make bold to enter one of these competitions myself, and would undertake at least (if I could not win a prize) to dig or turn over my portion of 110 square yards with a ten-inch spade in one hour. One hundred and ten yards for each man will come to 1210 yards for a team of eleven—which is 2½ chains or a quarter of an acre. Thus four teams would dig an acre in about an hour—either man against man, or team against team.

"I could go further into details but am content in this letter to draw attention to a really important but unaccountably neglected subject—that is to say, spade culture as a physical exercise, and the encouragement of training in the use of the spade, as a form of recreation and a source of individual and national profit."

Asparagus.

The inquiries we receive annually about asparagus are so numerous that it is evident that more interest is being taken in its culture than formerly, or else that its culture is not understood so well as it should be. The remark most frequently made is, "Our asparagus is nothing like so fine or good as it used to be—What is the cause ?" One of the most common causes is cutting the shoots too late. All cutting should cease at the latest by Midsummer Day ; but as vegetables are none too plentiful at that time, and as the beds are still throwing up some excellent shoots, cutting goes on for ten days or a fortnight longer. And this being repeated annually, the beds gradually become weaker, and plants die off altogether, so that the formerly good beds are spoiled. Another cause is the practice of throwing out the alleys between the beds a little deeper every year until eventually they may be a foot lower than the top of the beds. Now, as all asparagus beds are, or ought to be, well drained, this is not only unnecessary, but absolutely injurious; for when dry weather sets in, the raised beds become more or less dried up, and, if watered, most of the water runs off to waste. In a garden in the Midlands we saw a number of these raised beds with alleys nearly a foot deep, and all the asparagus weak and miserable in appearance. We recommended the owner to fill up the alleys, to within a couple of inches of the surface of the beds, with a mixture of equal parts of rotten manure and good soil. In two years better beds of asparagus could not be found anywhere.

Again, the prevalent system of putting a heavy application of manure on asparagus beds in the autumn is, in our opinion, altogether wrong, as it keeps the beds colder and wetter than they would be if no manure were on, and much of the valuable matter in the manure is washed away by winter rains and snow while the roots are dormant, and therefore unable to absorb it. Much better apply the manure early in March, when it really would do good; if left on all summer, it would not only feed the active roots, but would keep the beds cooler and moister at the season most needed. Salt or chemical manures could still be used in the ordinary manner.

Delicate Roses, 1908–1909.

It may be of interest to note that the following varieties of roses proved delicate at Wisley, and, if not killed, were very severely injured. Each variety is planted in clumps of twelve, and the plants had stood where they were for three years. It should be said that the frost at Wisley was very severe, zero being registered by the grass thermometer. 'Mrs. Edward Mawley' was one of the worst—practically all the plants were killed; 'Marquise de Salisbury' was another that was severely affected; 'Niphetos,' well known as a tender variety, maintained its bad reputation; 'Papa Gontier' had always succeeded well, and stood the winter well, but thirty-two degrees of frost proved too much for it at Wisley. 'Safrano' has always been a favourite of ours, because of its charming buds, but about half the plants were killed. 'William Allen Richardson' was killed entirely; and almost the same may be said of 'Exquisite,' only one plant being alive out of twelve. Both 'Perle des Jardins' and its climbing form suffered badly; and 'Grace Darling,' which is generally so hardy and vigorous, lost half its number. 'Madame Cadeau Ramey,' 'Gottfried Keller,' 'Princess Beatrice,' and 'Princesse de Sagon'' were nearly all killed; and even of 'La France' 25 per cent. died. It seems to us that the last named is not so satisfactory as it used to be. It is the first to be attacked by "rust," and a very large proportion of the buds never expand, but rot on the plants; not only at Wisley, but in many other places it behaved in the same way, and, as there are so many perfectly hardy and lovely varieties that are thoroughly satisfactory, we are seriously thinking of discarding this old favourite. It should be stated that all the roses named above were dwarfs on the briar stock.

BOOK REVIEWS.

"Studies in Fossil Botany." By D. H. Scott, M.A., Ph.D. Second Edition. Vol. ii., 8vo., 322 pp. (Black, London, 1909.) 5*s.* net.

Part I. of the second edition of Dr. Scott's work has already been reviewed in this Journal, and it was then pointed out that, owing to the rapid progress of our knowledge of fossil botany since 1904, Dr. Scott had been obliged to rewrite rather than revise his book. Most of the new matter appears in Part II. Chief interest attaches to the very clear account which is given of the Pteridosperms or fernlike seed-bearing plants and to the account of the Mesozoic Gymnosperms. The study of these groups of fossil plants has not only bridged over huge gaps in the history of the Vegetable Kingdom but has also led to a clearer understanding of the relationships of existing plants to each other. In other words, such study has done much towards "the completion of the natural system."

The author commences with a very complete account of *Lyginodendron Oldhamium*, now the most completely known of all fossil plants. He describes the way in which the stem (*Lyginodendron*), the root (*Kaloxylon Hookeri*), the petiole (*Rachiopteris aspera*), the frond impression (*Sphenopteris Höninghausi*), the microsporangia (*Crossotheca Höninghausi*), and the seed (*Lagenostoma Lomaxi*), have been proved to belong to one and the same species. From this plant, a complete typical Pteridosperm, the author proceeds to describe other Pteridosperms, and then fernlike plants which have not yet been proved to be seed-bearing, but can still be provisionally classed as "Cycadofilices." The Cordaitales, including the Cordaiteae and forms which link the latter to the Pteridosperms, are next taken. Careful treatment is then given to the Mesozoic Gymnosperms. The Bennettiteae are chiefly interesting on account of Dr. Wieland's wonderful discoveries. The hermaphrodite "flower" of *Cycadeoidea ingens* brings the origin of the Angiosperms within the region of scientific discussion. The author proceeds to deal with the fossil history of the Coniferae and examines fossil evidence for or against Professor Seward's theory that the Araucarieae are members of an ancient group of Gymnosperms descended from Lycopod ancestry. He agrees with Seward as to the antiquity of the Araucarieae and as to their primitive nature, but concludes that their affinities lie with the Cordaiteae rather than with Lycopods. Dr. Scott concludes with a long and extremely interesting chapter of "general results," in which he discusses fully the chief questions of classification and descent which have been affected by evidence afforded by fossil botany. He deals critically with the results of recent morphological investigation of living species whenever such results either support, or seem to contradict, conclusions based upon a study of fossils, and ends by putting forward a provisional scheme for the grouping of vascular plants, recent and extinct, into three main groups: (1) *Sphenopsida* (Equisetales, Pseudoborniales Sphenophyllales and Psilotales); (2) *Lyco-*

psida (Lycopodiales); and (3) *Pteropsida* (Filicales, Pteridospermae, Gymnospermae, Angiospermae). This scheme should provoke discussion and lead to fresh investigations.

The two volumes are well illustrated and good use has been made of photographs of sections.

"The Foundations of the Origin of Species." A sketch written in 1842, by Charles Darwin. Edited by his son, Frances Darwin, Hon. Fellow of Christ's College. 8vo., 53 pp. (University Press, Cambridge, 1909.) 7*s*. 6*d*. net.

A copy of this book was courteously presented by the Syndics of the University Press to each delegate at the Darwin Centenary commemoration. It contains an introduction by the editor of twenty-two, and the writing of his father, of fifty-three pages. The latter is divided into two parts. The first contains three sections: (1) On variation under domestication, and on the principles of selection; (2) on variation in a state of nature, and on the natural means of selection; and (3) on variation in instincts and other mental attributes.

Part II has two sections (4 and 5) on the Evidence of Geology; (6) Geographical Distribution; (7) Affinities and Classification; (8) Unity of Types; (9) Abortive Organs; and (10) Recapitulation and Conclusion.

The greater part of these rough notes for his book will be found developed in the "Origin" of 1859. But a feature which is profoundly interesting is the change of view from what is now called "Ecology," to that involving natural selection as a *means* in the "Origin of Species" which followed his reading Malthus' "Essay on Population." Later in life, *i.e.* from 1868, the date of his "Animals and Plants under Domestication," he again emphasized his original views, embodying them in the sixth edition of the "Origin," and candidly admitted his "mistake" to Prof. M. Wagner in a letter ("Life and Letters," iii., p. 159).

"The Recent Development of Physical Science." By W. C. D. Whetham, M.A., F.R.S. 4th edit., 8vo., 347 pp. (Murray, London, 1909.) 5*s*. net.

The first edition of this work appeared in June 1904. A second edition was demanded in September, and a third in October of the same year. This success was due, partly to the sensational nature of the advances in Science with which the book deals, and partly to the very able way in which difficult subjects, such as the nature of radio-activity and speculations as to the constitution of matter, were made plain to students of science who were not specialists in Physics, and to persons who had little definite scientific training, but who were, nevertheless, interested in the more important conclusions of scientific thought.

In this, the fourth edition, a few additions have been made to bring the work up to date; but since "no striking new branches" of Physics have been developed, it does not differ materially from the third.

For students of Botany and Horticulture, the chapter which deals with the problems of solution, while too short for a complete survey of the subject, should be sufficiently suggestive of thought to induce them to extend their reading on this topic. The fundamental importance to the biologist of a clear understanding of recent work on osmosis, on ionic conductivities and on colloidal solutions will be readily understood by all who have been brought face to face with the problems suggested by a study of the living cell.

We should, perhaps, advise the non-scientific reader to postpone his reading of the first chapter, which deals with the "philosophical basis of physical science," until he has finished the rest of the book. The author succeeds in giving an account, which is at once accurate and easy to follow, of such subjects as Liquefaction of Gases, Absolute Zero, Fusion and Solidification, Solution, Ionization, Conduction of Electricity through Gases, Cathode Rays, X Rays, Radio-activity and the nature of Matter and of the Ether. He ends with an admirable account of the work with the camera and spectroscope, which has brought the stars, metaphorically, into the laboratory of the physical chemist. The book contains portraits of Kelvin, Gibbs, Van 't Hoff and J. J. Thomson. Two beautiful photographs represent actual apparatus used by J. J. Thomson and C. T. R. Wilson, respectively, for their investigations into the constitution of the atom, but the descriptions of these photographs would be more easily followed if outline diagrams of the same apparatus were given. There are numerous diagrams and some very fine microphotographs of the minute structure of metals.

"The Geology of South Africa." By F. H. Hatch, Ph.D., and G. S. Corstorphine, Ph.D. Ed. 2. 8vo., xvi + 389 pp. Maps. (Macmillan, London, 1909.) 21*s.* net.

An account of the conformation and rocks of British South Africa, including the work of the most recent investigators is presented to the reader. The account is well illustrated by numerous diagrams and half-tone figures, and deals especially with the mineral wealth of South Africa.

"Flora of Cornwall." By F. Hamilton Davey, F.L.S. 8vo., lxxxviii + 570 pp. (Chegwidden, Penryn, 1909.) 21*s.* net.

Who will be the first to break away from the style of County Floras that has been the vogue for the past fifty years, and give us a complete county flora on ecological lines? Excellent beginnings have been made in a few parts of the country over comparatively small tracts, but none have attempted to cover any very wide area embracing very variable conditions. It is certain that the publication of such a flora would give an enormous impetus to the study of botany in different parts of the country, since it would give to many who have not yet realized the change that has come over botanical study of recent years, a concrete example of the kind of natural history work, which need not, and indeed should not, be confined to plants, which awaits the doing. There is room for much investigation into the ways of plants in their homes, and he would be doing a good work who turns the thoughts of the amateur botanist from the acquirement of a collection of dried plants to a more intimate study of their ways of life.

The present work makes no attempt at this, but will rank with the best of its predecessors as a list of plants with their local distribution within the county. A careful account of the topography, climate and geological structure of the county is followed by an interesting survey of the progress of botanical investigation therein, increased in value by a long list of publications dealing with the Cornish flora, comparative tables showing the composition of the flora and its relations with neighbouring ones, and portraits of those six ardent botanists the Rev. C. A. Johns, sometime Charles Kingsley's botanical instructor; James Cunnack, the bookseller of Helston; William Curnow, the market gardener of Penzance; John Ralfs, perhaps the greatest of all the Cornish botanists and most modest of men; T. A. Briggs, the author of the "Flora of Plymouth"; and R. V. Tellam, sometime a farmer; to every one of whom Cornish natural history is indebted. If any fault can be found with the book, judging it for what it is, and not for what it does not pretend to be, it is that the lists of localities are sometimes unnecessarily full. It seems unnecessary to give long lists of localities for such generally distributed plants as *Anemone nemorosa*, *Bartsia viscosa* and so on. On the other hand some interesting absences are noticeable in the list, for instance *Campanula rotundifolia*, so common in most parts of England, has only recently been recorded for the district around Penzance and is rare in other parts of the county, and *Lysimachia Nummularia* is found in only three out of the eight divisions of the county. One is thankful the author has refrained from publishing a list of localities for *Osmunda regalis*, for the "collector" is all too eager to root it up. One remembers with sorrow Wise's statement that the road between Brockenhurst and Lyndhurst, in the New Forest, is lined with royal ferns—is?— was, rather! Where are they now?

"An Introduction to the Study of Biology." By J. W. Kirkaldy and J. M. Drummond. 8vo., iv + 259 pp. (Clarendon Press, Oxford, 1909.) 6*s*. 6*d*.

The present book contains a course for the upper forms of schools and deals with the usual types of animals and plants. The "type system" is adhered to, but its evils are to some extent minimized by the intercalation of other connecting links between those usually studied. The language of the book is rather less technical than we often find in books of this class, but it does not always run easily; rather it reminds one in places of the diction of a note-book. A commendable feature is the attention given to the physiology of the different plants and animals dealt with.

Many of the illustrations have done duty before, and these are mostly good, but several are new, somewhat diagrammatic, and lack that fineness of line which was familiar in the days of steel-engravings, and so much more nearly approached nature. The lines of the beautiful "bell animalcule" are rather caricatured than pictured, and many look like reproductions of note-book illustrations.

"Physiography for Schools." By Professor R. D. Salisbury. 8vo., viii + 531 pp. (Murray, London, 1909.) 6*s*. net.

Those familiar with the larger text-book by the same author will be prepared to find in this smaller work an excellent guide for the younger student and an inspiring example for the teacher. They will not be disappointed, for it is conceived in the true educational spirit and written by a master hand with a lucidity difficult to equal and impossible to surpass. The illustrations are drawn entirely from North America, but the principles dealt with are the same the world through, and the book gives an excellent idea of the physical geography of the North American continent. A chapter unique in books of this kind deals in a brief but interesting way with the influence of physiography on plant and animal life—an aspect which includes much of what we now call ecology.

The illustrations, which are about equal in number to the pages, form a feature of great importance in the book, and are as lucid and educational as the text itself.

It is a book we can heartily recommend to any desiring some knowledge of the earth and climate and so on, and especially to teachers.

"The Nature Book." By various authors. 4to. (Cassell, London, 1909.) Parts 25 to 36, 7*d*. each, net.

This book is now completed, and the remarks made with regard to the first two volumes in our last issue are well merited by the last. Almost all branches of familiar nature are dealt with in a popular way and admirably illustrated by half-tone and colour prints.

"Catalogue and Field-Book of British Basidiomycetes." By Dr. M. C. Cooke, M.A., V.M.H. 10¼″ × 4″. (Wheldon, London, 1909.) 2*s*. 6*d*. net.

The venerable author of this Catalogue has done perhaps more to popularize the study of the higher fungi than anyone else since the time of Rev. M. J. Berkeley, and now students have reason to thank him for another extremely useful addition to the already long list of works upon these plants which have come from his pen. Annual "Fungus Forays" in various parts of the country and the patient investigations of a number of observers in many places have added to our knowledge of the distribution of these organisms through our islands, and the list of British species yearly grows longer. Dr. Cooke has collected all the records (of about 2,800 forms, according to a rough count) up to the end of 1908, and published the list, arranged as in Saccardo's "Sylloge," in a form which can be carried easily in the pocket, printed on one side of the paper only, thus leaving ample space for notes and additions. It will prove a most useful companion in the field on "Fungus Forays" and a useful record of progress in our knowledge of fungus distribution. No descriptions are given, of course, but edible species are distinguished from those known to be poisonous, and a few other notes add to the value of the list.

"Beginner's Botany." By L. H. Bailey. 8vo., 208 pp. (Macmillan, London, 1909.) 3*s*. 6*d*.

Those who are familiar with Professor Bailey's "Plant-Breeding" will be prepared to find an excellent work in the "Beginner's Botany." Like all good teachers, the author insists upon close observations of plants themselves. "Mere book-work or memory-stuffing is useless, and it may dwarf or divert the sympathies of active young minds."

This little work contains twenty-four chapters: the first four deal with the broad facts that no two plants or parts are alike. Hence the proof of variability. Then follows the struggle for life, which is ubiquitous, and the survival of the fit, and the results of adaptation on Plant Societies, being an outline of Ecology. We strongly approve of Mr. Bailey's introducing this subject so early.

The chapters following deal with the plant organs. Starting with seeds and germination, the student has to study roots, stems, leaves, buds, climbing plants, the flower and its parts, inflorescences, fruits, and dispersal of seeds, and in the last two chapters Cryptogams.

Each chapter is an excellent epitome, giving the most important and leading characteristics of the organs dealt with. The plants are, of course, often American, but the English pupil can easily obtain similar types. We heartily recommend this useful book, which has also upwards of 300 clear illustrations.

"The Botany of Worcestershire." By J. Amphlett and C. Rea, B.C.L., M.A. The Mosses and Hepatics, by J. E. Bagnall. 8vo., 651 pp. (Cornish, Birmingham, 1909.) 25*s.* net.

Worcestershire is divided into four districts, the Avon on the East, the Malvern on the West, the Lickey on the North-East, and the Severn from the North to South between the first two and the third.

The plan the authors have followed is to give the name of the species in Clarendon type; then follow details under the headings—Native, First Record, and the four Districts for Distribution. Each species concludes with an interesting account of the plants, where they are found, local names, history, uses and other interesting matters as occasion requires. No botanical descriptions are given. As the book has 654 pages, including the index, to do this would have increased the dimensions too greatly. The authors therefore wisely refer the student to Floras.

We do not see the advantage of calling the yellow water lily, *Nymphaea*, and the white one, *Castalia*; since both Bentham and Hooker keep to the well-known and very familiar *Nuphar* and *Nymphaea*, respectively. Nor why *Kentranthus* should have *K* and not *C*, because this is the familiar way of spelling it, and this letter is retained by the authors themselves in *Calamintha* and other Greek words.

It seems doubtful whether such obviously accidental escapes as snowberry and the Tea plant (*Lycium*), &c., need be included; for they have not become generally diffused wild flowers as, say, *Erigeron canadense* or *Linaria Cymbalaria*, &c.

A few details might be added thus: Baxter in his "Genera of British Plants" tells us that the London Rocket sprang up abundantly, after rubbish had been burnt, in the Oxford Botanic Gardens, in 1835, just as it did after The Fire of London.

The woad mentioned as cultivated is not now grown or used in Lincolnshire, the mills having closed about ten years ago.

The authors mention several maritime plants around Droitwich, *e.g.* *Spergularia salina*, *Polygonum Raii*, *Plantago maritima* (mentioned, but not at Droitwich), *Hordeum marinum*, *Agropyrum junceum*, &c. Now Droitwich is eighty miles from the sea, and Bad Nauheim 200, where salt-springs occur, and vegetation is subjected to salt spray, and similar "sea-side" plants occur there. *Plantago maritima* is especially common; while other ordinary inland plants are "fleshy." Hence the suspicion arises that they have arisen or been evolved on the spot, and the present writer suggests that the maritime plantain is a localized form of *P. Coronopus*, that *Spergularia salina* is derived from *S. rubra*; as *Polygonum Raii* is certainly from *P. aviculare*. Experimental verification is desirable, however.

The book will be found of very great use, not only to botanical students of Worcestershire, but to English botanists in general.

"Recent Progress in the Study of Variation, Heredity, and Evolution." By R. H. Lock, M.A. 2nd ed. 8vo., xiv + 334 pp. (Murray, London, 1909.) 5*s*. net.

This excellent survey of our knowledge of the laws of inheritance has already been reviewed in this JOURNAL (vol. xxxii. p. 306), when the first edition appeared. Several modifications of previous statements find a place in this edition as well as some new matter, and its value is increased by the addition of short lists of the best books dealing with the different aspects of the questions treated upon. It is certainly one of the best books on the subject which have appeared, and is written, for the most part, in language easy to be understood.

"An Orchid Stud-book." By R. A. Rolfe, A.L.S. and C. C. Hurst, F.L.S. 8vo., xlviii + 327 pp. (Leslie, Kew, 1909.) 7*s*. 6*d*. net.

Both orchid growers and those interested in the hybridization of plants from a scientific point of view owe a deep debt of gratitude to the authors of this "Enumeration of hybrid orchids of artificial origin, with their parents, raisers, date of first flowering, references to descriptions and figures, and synonymy." The book represents an enormous amount of work carefully done, for hybrids among orchids have come thick and fast since Dominy raised the first hybrid orchid, *Calanthe Masuca* × *C. furcata*, at Messrs. Veitch's Chelsea nursery, where it flowered in October, 1856, and since the difficulties of raising orchids from seed have been in large measure overcome; and the literature concerning them is scattered through many books and periodicals.

In the opening part, the authors give an excellent history of the hybridization of orchids, a copious bibliography of the subject and instructions for hybridizing and for raising orchid seedlings.

In the stud-book proper a list of parents arranged alphabetically with their hybrid offspring is given, followed by a second list, also arranged alphabetically, of hybrids with the names of the parents and other information.

So rapid has the production of hybrids been of late that a supplement containing the names and particulars of those flowering up to the end of 1907, since the first part of the book was passed, occupies seventy-four pages.

The authors have accepted the first published name of any hybrid as the one to be maintained when it conforms to certain rules they have laid down, and when it does not they have altered the name so that it will, and in some cases have coined entirely new ones. It seems a pity to alter existing names when it can be avoided, as in some cases it might have been, we think, here, and the result is we find quite well-known hybrids masquerading under unfamiliar names.

Where many names have been bestowed upon the same thing the choice of the oldest name is certainly the best in the long run, but it seems a pity to discard such well-known names as *Brassocattleya* × *Digbyano-Mossiae* and *Odontoglossum* × *crispo-Harryanum* upon what appear quite insufficient grounds. Short names of the Latin form are no doubt preferable to long ones commemorative of some person or place in the vernacular; but if rules are made concerning this, they should not be made retrospective at this late date. Many vernacular names are Latinized in the list; thus *Cattleya* × 'Lord Rothschild' becomes *C.* × *Rothschildiana* in the list, and others are shortened, *e.g.* *Cypripedium* × 'Princess Mary' becomes *Paphiopedilum* × 'May.'

"Practical School Gardening." By Percy Elford, M.A., and S. Eaton, F.R.H.S. 8vo., 224 pp. (Clarendon Press, Oxford, 1909.) 2*s.* net.

We are still looking for a book on "School Gardening" conceived and written in the spirit of the opening words of the introduction to this little book, and that of the final chapter, written by Mr. P. E. Meadon. School gardening in the hands of an enthusiastic and wise teacher may be made a very powerful educative factor, but if the school garden is utilized only as a place of instruction in the growing of big turnips and large potatos, then the greater part of its educative value will be lost.

The school garden should be a place where the powers of observation and the interest all children feel in the world of life may be fostered, where the beauty of order and the beauty of Nature may begin to be appreciated, where hand and eye may be exercised in work whose result will gradually develop under the watchful eye of the pupil, and where a tender reverence for living things (though no morbid sentimentality) may be engendered. "Garden" properly, certainly, but do not let the crops be the sole aim in the teacher's mind, any more than in the arithmetic lesson the correct answer to a sum is the only aim. Good crops and correct answers are essential, but a good understanding, lively observation, and method, are of more lasting value.

The book before us is an excellent guide to cottage gardening, and contains hints of great value to those having school gardens, but practical garden hints have been written so very often, and clear hints to teachers of methods by which the best educative results are to be attained so seldom, that we wish the authors could have carried out the desirable plan they have indicated here and there more fully.

"The Pond I Know." By W. P. Westell and H. E. Turner. 8vo., 78 pp. (Dent, London, 1909.) 8*d.* net.

One of a series of children's books describing in simple language easily observed natural objects found in ponds. Most of the animals and plants mentioned are illustrated, some of the pictures being coloured.

"Researches on Fungi." By Professor A. H. R. Buller, D.Sc. 8vo., xi + 287 pp. (Longmans, London, 1909.) 12*s.* 6*d.* net.

This volume is really a monograph on the production, liberation, and dispersion of the spores of the higher fungi, and is exceedingly interesting as an example of the application of certain aspects of physical science to investigation into a rather difficult but exceedingly fertile field of botanical research.

Our knowledge of the facts concerning the discharge and dispersal of fungus spores has, up till now, been very meagre and restricted to isolated and generally chance observations, and the author has filled a gap in our knowledge by the use of ingenious methods, and students of fungi are indebted to him not only for the painstaking work he has recorded, but also for the suggestiveness of his experiments.

The number of spores produced by a single fungus is prodigious, *e.g.* the author estimates that a single mushroom produces 1,800,000,000 spores, while the number in the giant puff-ball (*Lycoperdon Bovista*) is estimated at 7,000,000,000,000, and others produce a like abundance. How difficult it must be for the spores to find a suitable medium for growth and what an enormous waste of spores occurs!

The book is excellently illustrated by numerous well-executed figures and plates and is well-printed, but the paper is highly glazed and heavy and has an exceedingly unpleasant odour, so that it is impossible to read the book in comfort. A full index and a useful summary of the principal points in the investigations are given.

"The Garden Week by Week Throughout the Year." By Walter P. Wright. 8vo., 410 pp. (Grant Richards, London, 1909.) 6*s.* net.

A well-illustrated hand-book to garden operations, dealing with the selection of seeds both flowers and vegetables, the weekly work for every month in the year, descriptions of flowering plants, and much more information of a kindred nature. Vegetables and fruits are equally fully dealt with, and practically all garden operations are clearly described, and anyone requiring a guide as to what to grow, and the correct time to perform operations in a small garden, will find this book useful. It is well got up.

"The Handy Book of Pruning, Grafting and Budding." By James Udale. Ed. 2, 8vo., 136 pp. (W. & H. Smith, Evesham; Simpkin, Marshall, London, 1909.) 1*s.* 6*d.* net.

The call for a second edition of this excellent little book speaks well for its practical and useful character. Amateurs are frequently at a loss to know if their trees are properly or improperly pruned by the jobbing gardener they are obliged to call in, but in this little book the instructions are so clear and so plainly put forth that almost any novice may learn how trees should be pruned. Budding and grafting are equally well expounded, and we can commend the book to all possessing small gardens or even large ones. The printing is good, the illustrations are very clear, and although there is no index, the chapters indicate plainly the contents of the book.

"An Essay on the Making of Gardens." By Sir George Sitwell, Bart. 8vo., 109 pp. (Murray, London, 1909.) 5*s.* net.

The author has evidently made a very careful study of old Italian gardens, and much—very much—that he writes might be studied by makers of gardens in this country with advantage, as we are too apt to get into grooves and not take into account the surroundings so much as ought to be done. We do not quite agree with the author when he states "I would put the maxim that we must subordinate the house to the landscape, not the landscape to the house first." There may be many instances where this is possible, but in this country, with our uncertain climate, we think the house will generally be the first consideration, and the garden a secondary, although an important, matter. After an interesting introduction, the author opens with a chapter on the making of gardens and indicates the changes that have taken place since the publication of Bacon's essay on gardens in 1625, followed by brief descriptions of gardens in Italy, town gardens, garden details, garden and landscape, house and landscape, order and variety, water magic, sculpture in the garden, &c. The whole is admirably written and well printed.

"French Gardening." By Thomas Smith, F.R.H.S. 8vo. 128 pp. (Fels, London, 1909.) 2*s.* 6*d.* net.

So much nonsense has been written on the huge profits made by French gardening, that we give this volume a hearty welcome, as it shows in the clearest manner that only a person with capital and skill can make it a profitable enterprise. The author is a practical man, actually engaged in the work, and his writings are of real value. We may quote some of his remarks as a guide to those who may contemplate starting French gardening. For instance, "It should be distinctly understood that for success in this culture, some training in and knowledge of gardening is essential. No reasonable person would think of undertaking the management of any other business without a preliminary training; yet it is a fact that many people actually think that by reading a book and getting a few verbal explanations they can forthwith undertake, without further preliminary, this highly-specialized business, with full expectation of making a living. Such expectation is foolish, and must end in disappointment and disaster." How very true this is. Another and most important matter is the question of manure, and it is well to observe what the author says under this heading: "The quantity of manure necessary for a two-acre garden, planned on the lines given, is about 1,000 tons annually for the first three years, in addition to the 200 tons already mentioned for making compost, and about 100 tons used the first season for preparing the open-air beds for first crops." In addition to all this, there is the cost of frames, lights, cloches, mats, tools, &c., showing conclusively that only those with a good deal of capital should consider venturing on French gardening at all. We are afraid many have already lost money in this business through lack of capital and knowledge, and probably many others will also fail; but, on the other hand, the author and his valuable book indicate how money may be made by those possessing the requisite essentials, *i.e.* capital and skill. The author gives information on all points connected with the subject of a most practical nature, and the results from the Mayland French Garden are not only very interesting, but show what can be done under good management combined with the means of carrying on the work properly. It is a valuable book, full of sound information.

"French Market-Gardening." By John Weathers. 8vo., 227 pp. (Murray, London, 1909.) 3*s.* 6*d.*

Although there is a good deal of information in this book, some of it is not quite what is known as French gardening, as the culture is similar to what has been practised in this country for years. Again, we can scarcely imagine it possible to grow French beans on hot-beds outside, sown in the middle of December. Mention is made of a hot-bed, 24 inches in thickness, on which a temperature of 65° to 70° Fahrenheit is maintained. Even by very liberal banking or lining with fresh manure we never could maintain anything like such a temperature at that time of the year, and on through January. Then again, on page 67, the author, writing of globe artichokes, says, "When it is desired to force the plants, the operation is performed much in the same way as described for asparagus. The plants are taken up carefully in November and placed in a hot-bed, the heat of which is maintained, if necessary, by lining the frames with hot manure." We should like to see the author do it, and to see the frames. There is a good index and the book is well printed.

"Beautiful Gardens. How to Make and Maintain Them." By Walter P. Wright. 8vo., 307 pp. (Cassell, London, 1909.) 6*s.* net.

This is an enlarged edition and contains over ninety illustrations in colour and black and white, and, like the previous edition, the printing, style, and order of the book are admirable. It deals with the making of gardens, making of lawns, herbaceous borders, rock gardening, flower beds, bulbous plants, trees and shrubs, water gardens, pergolas, wall gardens, wild gardens, ferns, walks, and a great number of kinds of popular flowers, all written about in the usual clear manner possessed by this author.

"Lawns and Greens: Their Formation and Management." By T. W. Sanders, F.L.S. 8vo., 138 pp. (Collingridge, London, 1909.) 1*s.* net.

In this little book there is a mass of information that will prove invaluable, not only to the professional gardener and green-keeper, but also to the amateur. The latter is usually at a loss to know what a new lawn is likely to cost, and in addition to explicit directions on how to make a lawn, one may by the aid of this book form some idea of its probable cost. Instruction is given on the formation of lawns on different soils and on different sites, and the best seeds to sow to give good results on the various soils and situations. The improvement or renovation of thin, weedy, or worn out lawns, greens, and tennis courts is carefully gone into, and also the eradication of weeds. All who are interested in the important subject of lawns should peruse this excellent little book.

"British Woods and their Owners." By John Simpson. 8vo., 116 pp. (Pawson & Brailsford, Sheffield, 1909.) 12*s.* 6*d.* net.

Though there is little that can be said to be new in this book, yet a perusal of the several chapters will be interesting, particularly that in which a comparison of British and German woods is made, and their relative value in a purely economic sense plainly pointed out. We are rather doubtful about the Douglas fir being the coming timber tree, for although of rapid growth, the timber, from numerous experiments that have been made, has been found comparatively short lived, while the tree suffers much from wind—indeed, is only suited for valleys and other partially sheltered situations. That it may and does succeed at high altitudes we are quite aware, but its miserable appearance and whip-handle-like leading shoot only too clearly point out that it is ill-adapted for such situations. There is a great deal of truth in what the author points out as to the unreliability of the agricultural returns as to the extent of the woods and plantations in the country, and we are not aware that this has been brought to the notice of the public in any previous work of this kind. We are glad that the Japanese larch is so well spoken of, and in a conversation last week with Mr. Michie, the intelligent woods manager to the Duke of Portland, at Welbeck, Mr. Simpson's experience of this larch was quite borne out. We are curious to hear more about the covert "willow" (page 68), which the author describes as a natural seedling variety, and which is so valuable for covert purposes. In all probability it will turn out to be a hybrid form. There are some interesting figures given in Chapter V., but we cannot agree that the Corsican pine is inferior to the Douglas fir, nor that it cannot compete with the larch; while the price recorded for seedling sycamores only 4 in. and upwards in the middle, at 8*d.* per foot standing seems high. We rarely measure timber under 6 in. diameter at the small end. The book is well worth perusal for its general information, and is well printed and illustrated.

"Scientific Ideas of To-day: A Popular Account of the Nature of Matter, Electricity, Light, Heat, &c., in non-Technical Language." By Charles R. Gibson. 8vo. 344 pp. (Seeley, London, 1909.) 5*s.* net.

This is one of Messrs. Seeley's "Romance Series." The author warns readers not to "select a chapter, which appears interesting from its title and read that chapter first;" but to begin at Chapter I., as the author presumes that the preceding chapter has been read.

This advice is necessary when one notes the following contents: What things are made of. The stuff that atoms are made of. The construction of the atom. What is electricity? What is æther? What is magnetism? More about electrons in motion. What is energy? Waves in the æther. What is light? &c.

The illustrations are very clear and striking. Though the explanations of the phenomena are couched in popular terms, yet we can recommend them as being scientifically correct. The author deserves great praise for his exceedingly clever experiments and his simple and illuminating discourse upon them.

"Dutch Bulbs and Gardens." Painted by Mima Nixon. Described by Una Silberrad and Sophie Lyall. 8vo., 176 pp. (Black, London, 1909.) 7*s.* 6*d.* net.

This instructive volume treats of the cultivation of bulbs in Holland, the cultivators and their methods, and the charms of the bulb district when the flowers cover the ground with stretches of brilliant colouring, which is emphasized to a degree by the beautifully reproduced drawings.

Miss Una Silberrad describes the cultivation of bulbs and the ways of the growers with no lack of imagination, but one feels that a longer acquaintance would have resulted in a less highly coloured eulogy to that pattern of industry and virtue, the Dutch bulb-grower. Not the least interesting of Miss Silberrad's work are the historical sketches of the more familiar of our bulbs, and the many and careful references to the works of Parkinson, Clusius and others of the older writers are cleverly woven into pleasing contentions, and, although one may not always agree with the deductions, there is much to learn and much that adds a greater interest to the flowers we love. In treating of the cultivation of the Hyacinth Miss Silberrad makes no mention of a practice known as "Stoking"; how the bulbs are placed in a kind of huge oven, the great heat of which has the effect of retarding the natural and healthy sprouting of the bulbs, which, when planted, make their appearance above the ground two or three weeks later than those untreated. This fact alone would account for the certain failure of these bulbs when under the severe strain of forcing. This matters but little to the unscrupulous grower whose only desire is to produce saleable bulbs in the shortest possible time, placing them on the market at least a year sooner than those produced without artificial treatment, for these "stoked" bulbs swell in a prodigious manner, but they have not that solidity and weight of well grown bulbs, and the bloom, always the last to develop, remains weak and inconsiderable. But it would be unfair to condemn the whole for the few, for there are many true men and wise whom no inducement, however lucrative, would tempt to produce Hyacinths which they knew were worthless, and from which could not be expected the perfect big trussed flower, and who are making every effort to suppress this method, knowing that it spells ruin to the industry.

The 24 illustrations portray the unique and kaleidoscopic appearance of the bulb fields of Holland when covered with blooms of that bright fresh colouring in which spring flowering bulbous plants seem to excel more vividly than the most lucid description would make to appear possible, and Miss Mima Nixon has treated the subject with great freedom, a subject which, in the hands of a less skilful artist, might have the semblance of a multi-coloured chess board. "A Crocus Field," facing page 40, is a pleasing soft suffusion of mauve, and partakes of that freshness of early spring which is reflected so vividly by masses of this beautiful flower. "Darwin" Tulips, facing page 100, is also a fascinating drawing; the superior height of these Tulips is cleverly emphasized by their shadows thrown upon the path by the bright May sun.

The drawings are all beautifully reproduced, and well illustrate the perfection of modern half-tone printing.

Miss Sophie Lyall, in dealing with the Hyacinth culture at Haarlem in the eighteenth century, gives a free translation of Saint-Simon's "Des Jacinthes," published at Amsterdam 1768, and deals with the fashion and demand for the Double Hyacinths at that time, together with a physical analysis of the Hyacinth bulb, and should prove welcome reading to those to whom the work of Saint-Simon is a closed book.

"Geography: Structural, Physical, and Comparative." By Professor J. W. Gregory, D.Sc., F.R.S. 8vo. 305 pp.; 32 coloured maps and photographic illustrations, and 96 figs. (Blackie, London, 1908.) 6*s.* net.

Although this book is intended for use in schools, there is much that will be found interesting and profitable to the general reader, for the author, having set himself the task of stating the most important facts concerning the structural geography of the earth without the use of geological terms, has succeeded in presenting in a readable form some of the more modern theories of contemporary geography.

One might particularly mention the two useful chapters on the "Influence of the Atmosphere and Oceans," and throughout Part IV. occupying two-thirds of the book, and dealing with descriptive geography, great stress is laid on the part which climate plays in the economic development of countries. This important factor is ably described, and clearly illustrated by an admirable series of coloured maps showing isotherms, isobars, rainfall and winds.

"The Making of Species." By D. Dewer, B.A., F.Z.S., and F. Finn. 8vo., 400 pp. 15 illustrations. (Lane, London, 1909.) 7*s.* 6*d.* net.

In the preface the authors state the characters of four classes of books on Evolution, viz. (1) "Wallaceism," (2) "Lamarckism," (3) De Vries' views, and (4) "Books of a more judicial nature by men who decline to subscribe to any of the above creeds. . . . All four are characterized by defects. . . . Our aim has been twofold, to place before the general public in simple language a true statement of the present position of biological science, and to furnish scientific men of the day with food for reflection."

The eight chapters deal with the rise of and objections to the theory of natural selection, variation, hybridism, inheritance, coloration, sexual dimorphism and the factor of evolution. . . "We fear that this book will come as a rude shock to many scientific men."

The authors have much to say against each of the four classes of writers, and begin with "natural selection." Darwin's theory, they observe, "was enunciated at the psychological moment. . . . Most of the leading zoologists were evolutionists at heart, and were only too ready to accept any theory which afforded a plausible explanation" (5).* But "it would have been a good thing for zoology had Darwin not obtained so easy a victory" (7), for "it produced for a time a considerable mental stagnation among zoologists" (12). This is witnessed by "any popular book dealing with zoological theory; for it leaves the impression that there is nothing left to be explained in the living world, that there is no door leading to the secret chambers of nature to which natural selection is not an 'open sesame'" (13).

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* The numbers refer to the pages in the book.

So, too, in discussing sexual selection, which "remains to-day practically where Darwin left it," "this neglect affords an example of the baneful results of the too-ready acceptance of an enticing theory. 'Natural selection explains everything, why then investigate further?' seems to be the general attitude of our present day naturalists" (308). Similarly they have neglected the subject of "correlation" for the same reason (358).

When we try to find the authors' view with regard to natural selection, they first say: "We recognize the strength and the weakness of the Darwinian theory" (27); but they add: "It is incumbent upon us to prove our assertion that it does not afford an adequate explanation of all the varied phenomena observed in the organic world" (30). Yet they add: "There is no room for doubt that natural selection is a factor in the making of species" (34).

The next point for inquiry is, What are the authors' views on variations, upon which natural selection is supposed to act?

Darwin, they remind us, "makes no attempt to explain variation" (35). They rightly observe that "the double assumption that variations are for all practical purposes haphazard in origin and indefinite in direction is necessary if natural selection is to be the main factor in evolution. For if variations be not haphazard, if they are definite, if there be a directive force behind them . . . then selection is not the fundamental cause of evolution" (53).

The authors, at this point, call attention to Darwin's later views, in which he strongly emphasizes "definite variations." These will be found in his "Animals and Plants under Domestication," vol. ii. pp. 250, 253, 256, 271; and "Origin," 6th ed. He attributes all variations to the "direct action of changed conditions of life." The results are (he says) either "indefinite" *or* "definite." If the former, then natural selection must be called in; if the latter, then it is not required, as *all* the individuals vary in adaptation. And although, if there be too many to live, the stronger may oust the weaker, yet *all changed in adaptation*, there are *no* "inadaptive" or "injurious" variations at all; unless malformations, arrested developments, like "pink eyes, &c., are to be reckoned as variations." Then these will probably always die in the struggle for life. Apart from such, Nature makes no such mistakes as to produce indiscriminate or indefinite variations. There is, in fact, no such *alternative* as Darwin thought.

Darwin did not, therefore, in later life "contradict himself" or "scarcely know his own mind" (54); or say that "definite variability is far less important than indefinite" (55), though in the first edition of the "Origin" this last statement is true, as stated in the Preface; but in 1876 he considered it the "greatest mistake" he had made to have overlooked the importance of definite variations (letter to Wagner).

Let us now come to the distinction between continuous and discontinuous variations, which are now called mutations, sports, or well-marked and suddenly appearing differences, which may be hereditary.

What causes them to appear? Referring to poultry the authors say that "faults" occur so frequently in each breed, that the fact shows how strong is the tendency to vary in certain definite directions (64). Apart from "reversions," the authors can only suggest as a cause [?] that there is evidence to show that variations frequently occur along certain definite lines only (68).

With regard to mutations, they observe of De Vries' experiments with plants, "We believe that some of his conclusions are applicable to plants. We are far from accepting his theory of mutations *in toto*; we are, however, convinced that he is on the right track" (75, 76). It is described thus: "First arises a well-marked variety, by a single mutation. Subsequent mutations follow, so that a distinct race is produced. And, finally, fresh mutations occur, so that a new species is eventually produced" (88, 89). The authors' view is thus expressed: "We think it probable that all species throw off, at greater or less intervals, discontinuous variations, and that it is upon these that natural selection acts" (106).

Thus far the authors do not appear to differ from Darwin. The latter says, in fact, "Given indefinite variations, natural selection determines the fittest to survive." The authors would say: "Given mutations," &c. But mutations are only variations after all; and if it be asked why they differ from the parent so as to be called mutations, the answer brings us to the ultimate cause—recognized by Weismann and Darwin—"the changed conditions of life." The effect, as seen in the "response," may be small or considerable, at once, or after accumulative influences have taken place; and it then appears as a "sport" or mutation, which perhaps may be hereditary, or not at all, for reasons unknown to man. Next, as to correlations, we would interpret these not as being the result or effect of *one* changing organ upon all the rest of an organism; but the *whole being* responds simultaneously in an adaptive direction; or may be in an "injurious" direction *under domestication*, as when a bird "sports" in producing a tuft of feathers on the head, the skull is so affected by "correlation" that it is far too thin to resist the slightest blow (Tegetmeier).

With regard to mimicry, we think the authors give the true explanation. "The true interpretation of the resemblance is probably that both squirrels and tupaias are adapted to a life in trees. Like profession begets like appearance; the ground-living shrews much resemble mice, and the moles find representatives in mole-like rodents" (180). Still better illustrations are in the various members of the Marsupials mimicking various types of mammalia, &c. Their similar "characters" were, therefore, "acquired" or "begotten," as the authors say, and are now hereditary.

The authors describe four kinds of mutations in animals (339 ff.), and express their own view thus: "Evolution proceeds by mutations, which may be large or small" (344).

The eighth and last chapter deals with the "Factors of Evolution." The authors say, "The first of these factors considered, is the tendency of organisms to vary along definite lines" (345). Darwin did not recognize any inherent "tendency" to vary, *apart from* the direct action of changed conditions of life. The authors do not appear to us to lay enough stress upon *this*, the obvious and primary cause of all variations. As Dr. Weismann acknowledges, "We are driven to the conclusion that the ultimate origin of hereditary individual differences lies in the direct action of external influences upon the organism" ("Essays on Heredity," p. 279).

"The second great factor is natural selection" (345). This requires "indefinite variations," of which there is no proof of such ever existing in Nature.

The third factor is mutations, but "at present we are totally in the dark as to what causes them" (380).

The few concluding pages are too hypothetical for any true scientific basis, and the result left on the reader's mind is that authors differ very little from Darwin's original view of his theory expressed by the title of his book, and that they are not sufficiently aware of the value of "response to the direct action of changed conditions of life."

"Insect Pests of the Farm and Garden." By F. Martin Duncan. 8vo., 143 pp. (Sonnenschein, London, 1906.) 2*s.* 6*d.* net.

After a brief outline of the main points in the structure of insects, the author deals with the appearance and occurrence of some of the principal insect pests of farm and garden. Some of the best-known remedies are detailed.

Most of the illustrations are from photographs. Photographs of insects leave very much to be desired, and are far less useful than well-executed drawings; and, in any case, the lack of an indication of the actual size of the creatures is a serious omission.

"Woodside, Burnside, Hillside, and Marsh." By J. W. Tutt, F.E.S. 8vo., 241 pp. (Sonnenschein, London, 1906.) 2*s.* 6*d.* net.

A little book dealing in simple and interesting fashion with the common objects, plants, and animals of the country.

"Butterflies and Moths of the United Kingdom." By W. E. Kirby. 8vo., lii + 468 pp. (Routledge, London, n.d.) 7*s.* 6*d.* net.

This book will be welcomed by many nature lovers, since it gives a coloured figure and description of every British butterfly and moth, including several of those which once occurred but have long been extinct. Types of the smaller moths (Micro-lepidoptera) are also figured and described. Where known the caterpillars and chrysalides are also described, and in many instances figured, and notes upon the food plants, time of appearance, and so on, add greatly to the value of the book.

No attempt has been made to bring classification up to date, but no book could be more welcome than this to a young "moth hunter" nor better serve as an introduction to a knowledge of the most popular group of insects. Considering the price of the book the coloured plates with their mostly life-sized figures are admirably done, and two well-made indexes add to its usefulness.

"The Vegetable Grower's Guide." By John Wright, V.M.H., and Horace J. Wright. Vol. II., 4to., 350 pp. (Virtue, London, 1909.) 21*s*.

The first volume of this work has already been reviewed, and the second has just reached us. As for the first, we have little but praise for such an excellent, well-printed, and beautifully illustrated book. The work is most comprehensive, and deals with soil management, manuring, rotational cropping, the destruction of enemies, making of kitchen gardens, forcing, &c., including mushroom culture. In fact, there is scarcely a subject that is not treated in a most capable manner. The coloured plates and the practical drawings and diagrams are very good, and the combination of valuable information and beauty of illustrations will appeal to most readers. The best varieties of vegetables of each kind are given, and if the instructions of cultivation are followed out, a very high standard of gardening will be the result. Happily, the love of gardening is increasing amongst all classes, greatly to the benefit of the whole community, and though this work will be too expensive for the humbler devotees of horticulture, it is well within the reach of their richer brethren. A very good index finishes a most useful work.

"A History of Botany, 1860–1900," being a continuation of Sachs's "History of Botany, 1530–1860." By J. Reynolds Green, Sc.D., F.R.S. 8vo., 543 pp. (Clarendon Press, Oxford, 1909.) 9*s*. 6*d*. net.

The reader will be prepared to be assured that this work is quite equal to Sach's, and as complete an epitome as possible of what has been done in physiology, &c. since 1860. There are three "Books": 1. MORPHOLOGY (91 pp.); 2. ANATOMY (70 pp.); 3. PHYSIOLOGY (214 pp.).

Besides the author's own well known researches, he has gathered together most carefully a vast collection of matter, requiring no less than 32 pp., of Bibliography, or, roughly, 800 names of botanists.

The book is a valuable one for reference on every subject dealt with by physiological botanists of the last fifty years.

It was hardly to be expected that the author would go outside this sphere and discuss the important subject of Ecology, which is too young to have grown to the dimensions of its older confrère of Physiology; but in the next "Jubilee" we may hope to find it treated in full, as Schimper and Warming have done.

"Botany of To-day. A Popular Account of Recent Notable Discoveries." By G. F. Scott-Elliot, M.A., B.Sc., &c. 8vo., 352 pp. (Seeley, London, 1909.) 5*s*. net.

This excellent work, mainly a compilation from a vast number of authors, puts present-day Botany in its true position, considering the physiology of plants as the interpreter of their structures and habits. There are 29 chapters. The following subjects will give a general idea as to the author's plan. As everything alive depends on Protoplasm, he begins with the question "What is Protoplasm?" Starting with the theory that plants commenced as aquatics, Sea-weeds and Leaf Green is the second chapter; then, The First Land-plants; Bacteria; Rock Lichens; Mosses, and the Fern Alliance; Alpine, Arctic and Antarctic

Ferns; Tropical Forest; Reconquest of the Water. Here a better title would have been "Re-adaptation to Water"—water plants being in a degenerate state as compared with land plants, because many structural features are no longer required. Then we find specialities dealt with, as Sense-life and Sensibility; the Individual Plant; the effects of the environment come under Sunshine, Rain, and Wind; Ants and Mites; Electricity, Radium, N- and X-Rays; the last chapter being on Evil in Small Doses.

Mr. Elliot has travelled much, and observed, and is well qualified to add—as he has done—important matters wherever required to the researches of the eminent botanists to whose writings he refers.

Every one of the chapters is full of interesting matter, and written in a fascinating style, and ought to encourage beginners to observe and generalize about the structure and habits of plants, whenever they are out of doors.

Here and there we noticed a few points which might be mentioned. As to the origin of vegetation, our own idea is that it began on *moist ground*, but not actually *submerged*. *Podostemaceae* show how *degeneracy* causes a "sea-weed"-like form. The protonema of mosses resembles a *Conferva*, but that is no proof it *first* was one, or any such-like aquatic plant. We are inclined to put *bacteria* and such microbes as on the lowest level of plant life, by degeneration of higher fungi, rather than *algae* (p. 41).

Mr. Elliot adopts the general view that coal vegetation was aquatic or marsh. But, as has been pointed out, the structure of Lepidodendrons, &c., is xerophytic (p. 80). The fruits of composites are said to be mostly carried by wind, but those with a pappus form the minority (pp. 103, 105).

According to an excellent Atlas published in Cape Town, 100 fathoms would unite the islands on the *east* (not west, as stated) of Patagonia with South America; but 2,000 fathoms would be required to join Graham Land and the South Antarctic continent with South America, the Cape and Australia, by northern projections, including Kerguelen's Island (p. 103). This would explain the presence of South American plants in the others, as stated on p. 105, to which list *Fuchsia* might be added as occurring in New Zealand, though its "home" is South America.

"Sir Joseph Banks, the Father of Australia." By J. H. Maiden. 8vo., 244 pp. (Kegan Paul, London, 1909.) 6*s*. net.

"The Committee of the Banks Memorial Fund feel that the memory of the greatest benefactor of early Australia is worthy of some enduring recognition, and a statue in Sydney in the highest style of art has been suggested. . . . This work has only two objects—to disseminate information concerning Australia's greatest early friend, and to suggest that my readers may be pleased to open their purse-strings for the purpose of establishing a memorial to him." Thus speaks the writer, and he has admirably contributed to the former by a most excellent compilation of all the information about Sir J. Banks he could procure.

The book has five parts, dealing with: Banks as a Traveller; his Botanical Activities; Protégés; as President of Royal Society, and Friend of Australia; and the Works and Memorials of Banks. It has sixty-four illustrations, charts, and maps. Numerous interesting episodes are supplied, as, for example, the discovery of New South Wales, and the first landing of Cook and Banks in Botany Bay. A chapter is devoted to the Banksian botanist-librarians, as Solander, Dryander, Robert Brown, with interesting letters from various botanists, including Sir W. J. Hooker (1810), R. Brown, J. E. Smith, &c. Another chapter tells of Banks as President of the Royal Society, over the interests of which he "watched in the most earnest manner." "He took a personal interest in all elections, not hesitating to speak to members about the qualifications of the candidates." It is not surprising that such conduct was distasteful to some. A smouldering discontent broke out into activity, but when a vote of censure was put, the non-contents were 39 against 139.

The memoranda and botanical collections of Linnæus were offered to Banks for £1,000, but declined. Mr. J. E. Smith, then a medical student, heard this, and obtaining the money from his father, bought them. Then the Linnæan Society was founded in 1788. Besides being a Fellow Founder of this, he was also a founder of the Royal Institution in 1799. He is also named in the Charter of the Royal Horticultural Society in 1809. Shortly after his death the Banksian Medal was established.

In the concluding chapters, Banks' interest in the progress of Australia generally, and in the wool industry, will be found interesting.

The book appears to be an exhaustive collection of all facts known about him, and must be studied by anyone wishing to know the early history of Australia.

"A Textbook of Botany for Students; with Directions for Practical Work." By Amy F. M. Johnson, B.Sc. 8vo., 535 pp. (Allman, London, 1909.) 6*s*. net.

This excellent Manual contains 535 pages, and is well illustrated. First intended for her own pupils, "the subject-matter will be helpful" for several public examinations enumerated.

It has five parts—General Morphology, Histology, Physiology, Ecology, and Systematic Botany. Each part is treated as concisely, but clearly, as possible, and a well selected series of families is given for study. Instructions for practical work close every part. The book is evidently intended for the class-room, and for this purpose it is excellent.

But book and laboratory *alone* have always a tendency to "cram," which must be counteracted by plenty of "Nature Study" in the open. This is the great educational value of Ecology. The author only devotes 24 pages to it, containing a summary of some adaptations and observations of plant associations, &c. But what one misses in this and so many other text-books of a like character, is an appreciation of training the pupil, not only to observe, but to *generalize for himself*. *E.g.*, the author more than once alludes to the supposed protective purpose of spinescent processes. Ecology soon shows the fallacy of this hypothesis; the author correctly observes they are xerophytic characters, *i.e.* not only accompanied by, but actually *caused* by drought. If such plants grow in moist conditions, the spines soon disappear, as in cultivated pears and plums, rest-harrow, barberry, furze, &c. In deserts, where they abound, the only quadruped likely to browse upon them is the camel; and this has so tough a lining to its mouth that it lives on the "Camel's-thorn" Acacia. So too, cows and sheep will eat holly, and horses chopped furze.

Such *a priori* assumptions are survivals of the old false reasoning of our forefathers. Again, the author says that in dissected submerged leaves "the assimilating area is increased" (p. 220); but if a leaf blade has the flat parts cut out and only the "skeleton" remaining, it is obvious the area is reduced. Ecology, which always looks for *explanations*, soon observes that *water is the cause*; while experiments verify this by the development of full-sized leaves *under water* when properly nourished by nutritive salts. Moreover, if a leaf be half in and half out of the water, the lower half only is dissected.

Fig. 45, I *a*, of Forget-me-not, has long ago been shown to be erroneous; for the buds appear in *pairs*, not *singly*, the inflorescence being a raceme, not a cyme.

The oft-corrected mistake of Darwin's, that self-fertilization is injurious, is still maintained (p. 213); for self-fertilized weeds are by far the most prolific.

Primula (p. 381) is no exception to the rule of having *two* cotyledons.

Monocotyledons are said to be of "low growth" (p. 381). The author has forgotten palm-trees and many Dracænas. Climbing palms grow more than 300 feet in length, and bamboos, 100.

The cotyledon of a monocotyledon is not *strictly*, but only apparently, "terminal," because the axil is turned to one side, giving only a seemingly lateral source to the plumule.

The above are some of the more important points which might be corrected with advantage in a second edition; but the author—a skilled teacher *indoors*—has not grasped the full significance of Ecology as an *outdoor* educational weapon.

"Field and Woodland Plants." By W. S. Furneaux. 8vo., 383 pp. (Longmans, London, 1909.) 6*s*. net.

This book is described as "a guide to the study of our wild plants, which, though comparatively free from technical terms, shall be strictly correct and scientific." "A large portion has been allotted to the descriptions of plants . . . but not a little has been devoted to an attempt to create an interest in . . . habits."

Though the author writes "not a little" we should like to have seen a *great deal more* than there is. The book consists practically of seasonal and local selections of plants, popularly but generally accurately described; such being doubtless intended, as the author says, as a "guide" or help to beginners, who can compare the living plant with the text. But as a member of the "Outdoor Series," it is quite inappropriate. The author appears to know nothing of Ecology, or the true method of studying plants in the open. He has made some groups as, "Heath, Down, and Moor." Nothing, however, but structural characters is given to each plant: not a word is there as to their general xerophytic features, nor of the causes or advantages of such. The book is thus quite behind the present-day method of studying plants. Though for the most part the descriptions are accurate, yet it may be worth while to note the following points. Speaking on the "advantages" of crossing, the author holds to the long ago abandoned theory that crossing produces "better seed" (p. 26). Yet he shows how violets depended entirely upon their self-fertilized cleistogamous buds (p. 52).

The Virginia creeper does not climb by "rootlets," but metamorphosed flowering branches (p. 33).

Climbing stems cannot "revolve," but "circumnutate" (p. 33).

Lime-leaves do not curl downwards on expansion to prevent "loss of sap," but to avoid "radiation," as is the case with "sleeping" leaves (p. 45).

An "inferior" ovary has not a "calyx" but "receptacular tube," to which it is adherent.

Yew "fruits" are described as being harmless. This is a dangerous mistake. The "seeds"—the yew has no "fruit"—are *deadly*, and children when not careful to extract them have often been poisoned. The scarlet *cap only* is harmless.

In the "Glossary" we note the following: a "corymb," as described, would include the "umbel," but the former is definite, the latter indefinite.

"Panicle" is not limited to indefinite inflorescences; *e.g.* in *Gypsophila paniculata*, they are definite "cymes," but forming a panicle, &c.

The book will be decidedly useful to those who are desirous of knowing, and are contented with, the *names* of our wild flowers, but desire little more knowledge of plant life and its marvels.

"Der Königliche Botanische Garten und das Königliche Botanische Museum zu Dahlem." By the Staff. 4to., 158 pp. (Horn & Raasch, Berlin, 1909.) 6*s*.

The Botanic Garden at Dahlem has been established a comparatively short time, but has already become famous on account of the amount of work accomplished and the novel plan on which it is arranged. The present official publication gives an account of its arrangement, and the illustrations (which are worthy of all praise) and plans of the garden and the houses and museums give a good idea of the object in view in the planning and the way in which the object has been attained. It is in no sense a horticultural establishment—far less so than Kew has in some ways become of late—but has for its main idea the illustration of the vegetation of the earth grouped according to geographical distribution, while in other parts of the garden are collections to illustrate systematic botany and morphology. A perusal of the book, which is worthy of the great garden it describes—and that is high praise—will give an excellent idea of the foremost German Botanic Garden.

"Nature through the Microscope." By Wm. Spiers, M.A., F.R.M.S. 8vo., 355 pp. (Culley, London, 1909.) 7*s*. 6*d*. net.

This is a book for the *dilettante*, if one may use the term in this connexion, and not for the serious student of nature. It gives some good advice on the choice of a microscope, advice that might with advantage have been amplified, and it draws on all mundane nature for objects to examine with the microscope, so that no one who desires need be without some suggestion as to what to see. The language of the book is very free from technicalities, and the illustrations, which are very numerous, are in many cases good.

"Inorganic Chemistry." Part I. By F. S. Kipping and W. H. Perkin. 8vo., viii + 312 pp. (Chambers, London, 1909.) 3*s.* 6*d.*

Of the many introductions to elementary chemistry this is perhaps the best of those recently published. It is arranged on a logical plan, so as to carry the student on from one subject about which he has learned to another a step more advanced, and a second part of the work is to follow so designed that it will be a continuation of this. No better book could be put in the hands of the young student to supplement and emphasize the practical work of the laboratory.

"Fungi and How to Know Them." By E. W. Swanton. 8vo., xi + 210 pp. (Methuen, London, 1909.) 6*s.* net.

Almost everyone is attracted by the brilliant colour of the scarlet-capped "fly-agaric" or the curious, bun-like Boleti of the woods, in autumn, at any rate so far as to desire to knock their caps off! Not a few desire more, to know their names and something of their ways of life; and more still, perhaps, are interested in the question of whether or not they are edible. To these we can heartily recommend this book, which will serve as a reliable introduction to the works of Massee, Cooke, and other authorities. It is well illustrated by many figures in black and white, and by several in colours, by which one may recognize almost any of the fungi commonly met with.

"Bacteria in Relation to Country Life." By J. G. Lipman, A.M., Ph.D. 8vo., xx + 486 pp. (Macmillan, New York, 1908.) 6*s.* 6*d.* net.

When one realizes the profound changes which bacteria bring about in organic matter in a short space of time, owing to their prodigious powers of increase, it is easy to understand how a knowledge of their mode of action is likely to put into the hands of man a power which he may use for the betterment of many of his activities. Already the dairy industry has been revolutionized in some countries through the application of our knowledge of bacterial action; changes have been brought about in the canning and fruit-preserving industries; difficulties met with in the wine and beer making industries have been overcome; and other industries depending upon fermentation processes have been aided. Our outlook to infectious diseases has been completely altered, and much suffering has been prevented or alleviated. Now we are finding out more and more concerning the action of bacteria in the soil, and no doubt when more is known some of our horticultural processes will be modified, just as other great industries have been. The book before us deals in a clear and interesting way with many of the aspects of bacterial life and the ways in which it comes in contact with our own activities, and will repay perusal by anyone taking an interest in country industries, and particularly in those connected with the water and milk supply and with the soil.

"Agriculture in the Tropics: an Elementary Treatise." By J. C. Willis, M.A., Sc.D. 8vo., xviii + 222 pp., with twenty-five plates. (University Press, Cambridge, 1909.) 7*s*. 6*d*. net.

The author, who is Director of the Royal Botanic Gardens, Ceylon, states in his preface that his object in writing this book has been to set before the general public as clearly as possible something of the "political and theoretical side of tropical agriculture, showing what such agriculture really is, the conditions under which it is carried on, its successes and disasters and their causes, the great revolution that is being effected by Western influences, and other general principles underlying the whole subject in whatever country it may be carried on." The book is divided into four parts. The first part is devoted to the "Preliminaries to Agriculture," and treats of land and soil, climate, labour, manuring and cropping, and kindred subjects. The principal crops cultivated in the tropics are dealt with in part ii. The crops mentioned comprise rice and other cereals, sugar, tea, coffee, cocoa, cocoanuts, spices, tobacco, drugs, fibre-yielding plants, dyeing and tanning substances, oil-yielding plants, rubber, gutta-percha, camphor, and native crops. There is also a chapter on plant diseases, and one on live stock. The descriptions of some of the crops are rather meagre, and it is this part of the book that it seems desirable to enlarge in a future edition.

A general account of agriculture in the tropics is given in part iii., and this part of the book affords the best reading. In discussing village or peasant agriculture the author writes: "The ideal of some administrators in the tropics has apparently been, and of a sprinkling of people in Europe and America who have no acquaintance with actual tropical conditions still is, a kind of 'old-fashioned Socialist' one—a dense population of small cultivators, each tilling his own little piece of land and growing or making practically everything he requires. The nearest approach to this is probably to be seen in outlying districts of many tropical countries far removed from the influence of Europeans or Chinese. In the most extreme cases there may be practically no capitalist enterprise in the country at all, and the corollary is, of course the absence of any appreciable export trade, or, in other words, so far as the remainder of mankind is concerned the country might almost as well be non-existent."

Further on he states: "the white races of Europe and America at present control the tropics, and they must and will have the products of the latter in large quantities. . . . The white powers cannot and will not allow the largest and probably the richest areas of the world to be wasted by being entirely devoted to the supply of the native population, when they are capable of both feeding a large population of their own and supplying the wants of the colder zones in many food stuffs, fibres, oils, timbers, and other useful products otherwise unobtainable." Other important matters dealt with in this part of the book are the financing of village agriculture and the provision of local markets; the possibility of improving the crops and methods of peasant agriculture; and the bearing upon agricultural progress of the education of the peasants. In the chapter headed "Capitalist or Estate Agriculture" the author shows to what importance the "planting industry" has grown, and points out the dangers as well as the advantages of large concerns. He comes to the conclusion that the best course to adopt is to encourage the diversification of agriculture, so that not only will many different kinds of crops be cultivated, but all sorts of methods of cultivation will be employed, from that of the large organization with modern machinery down to that of the peasant proprietor who, with his family, cultivates a small plot with primitive tools.

In part iv., which concludes the book, agricultural organization and policy so far as it affects the tropics is discussed, and the author makes many suggestions which are worthy of careful consideration.

The book is well printed and bound, and the illustrations, which are reproduced from photographs, are clear and instructive. We think, however, there is some mistake with regard to plate xix., which certainly does not illustrate the preparation of rubber.

A perusal of the book will give one a good grasp of the subject treated, but as a handbook for the planter more details are required in that part which deals with crops.

For the general reader parts iii. and iv. afford interesting reading, and convey an idea of the problems and difficulties which the tropical agriculturist has to meet, and at the same time point out a path by which some at least of the difficulties can be avoided.

"The Book of Flowers." By Katherine Tynan and Frances Maitland. 8vo., 319 pp. (Smith, Elder, London, 1909.) 6*s*. net.

"A First Book of Wild Flowers." By Margaret M. Rankin. With 112 illustrations, in colour, by Nora Hedley. 8vo., 180 pp. (Melrose, London, 1909.) 6*s*. net.

"The Wild Flowers." By J. H. Crawford. Containing 16 illustrations, in colour, by E. Alexander; and text illustrations, by J. Williamson. 2nd ed. 8vo., 232 pp. (Foulis, Edinburgh, 1909.) 5*s*. net.

These three books are not *botanical*, nor are they suitable for *nature study*. The first would, in our opinion, be the most useful for its interesting folk-lore. The authoresses have collected a large amount of matter from the old herbals of the sixteenth century, about the supposed properties of plants, with legends, superstitions, &c., and added appropriate poetry. It is not illustrated. The plants are arranged according to their seasons of blossoming.

The second contains upwards of a hundred "talks" about the flowers illustrated. It is intended for very young children, so no scientific terms or descriptions are given, only simple matters. The illustrations are beautifully done.

The third is a more ambitious book in "get up," but like the two former, it lays no claim to affording any instruction botanically. It consists of pleasant descriptions of the author's ramblings, apparently for the most part in Scotland, calling attention to (not describing) the numerous wild flowers met with. Thus, turning to the Index with reference to "Orchids" (p. 106), all the author tells us is, "At least four orchids grow in this wood—among them the rose-coloured, sweet-scented orchid, and the other with the black spots on the green leaves."

"Beautiful Flowers and How to Grow Them." By H. J. Wright and W. P. Wright. 8vo., 202 pp. (Jack, London, 1909.) In 17 parts, 1*s*. each.

We have received Parts 10 to 17, inclusive, of this work, dealing with the following subjects: The Dahlia, Sweet Peas, Annuals, Aquatic Plants, Arches, Pergolas, Pillars, Stumps, Beautiful Walls and Fences, Orchids, Chrysanthemums, Tender Bedding Plants, Flowers for Suburban Gardens. Like the first portion, the printing is good. The illustrations are excellent, and the matter is practical and written in a very interesting style. A good index finishes the work.

"Popular Bulb Culture." By W. D. Drury. Ed. 3. 8vo., 123 pp. (Upcott Gill, London, 1910.) 1*s*. net.

This excellent and popular manual has now run into its third edition, and has been revised and enlarged and brought well up to date. An Appendix has been added, giving a wider selection of species and varieties than was necessary or desirable in the body of the work. To facilitate reference, an alphabetical arrangement has been followed, and most of the plants are described under their popular names as well as their proper ones. Bulbs generally are not so much grown as they ought to be; even in many comparatively large gardens they are seldom seen except in the spring. Yet how delightful is a mass of *Colchicum speciosum* in October, when most flowers are over in the open. Some say, "Oh, they will not do in my soil," but usually the fault is not in the soil, but the time of planting, July being far the best month to put in these bulbs. The advice given in this thoroughly practical work should be carefully read by all who intend planting bulbs, especially the advice on the time to plant. Most of the insect and fungoid pests that attack bulbs and corms are mentioned, together with the best means of checking their ravages.

"The Book of the Cottage Garden." By Charles Thonger. 8vo., 91 pp. (Lane, London, 1909.) 2*s*. 6*d*. net.

This is a useful manual for the lady or gentleman possessing a cottage in the country, and deals with all the various phases of the garden usually attached: with the lawns and grass plots, hardy border flowers, annuals and biennials, roses, garden colour and fragrance, vegetables, and fruit. The information is practical, and the illustrations are excellent.

"The English Vegetable Garden." By Experts. 8vo., 361 pp. (Country Life, London, 1909.) 8*s*. 6*d*. net.

The great importance of a varied and continuous supply of tender, well-grown vegetables for home consumption can scarcely be overestimated, and the gardener who cannot maintain a supply for his employer's table, and for the servants' hall, will soon find himself in difficulties. The aim of the book is not only to show how all with sufficient ground at their disposal may grow all the vegetables they require, and how to grow them, but what is equally important, how to cook them. All the best varieties of each kind of vegetable and salad are named. The innumerable diseases and pests that attack vegetables are described, and the best methods of fighting such foes are fully dealt with. The whole book is so very practical and reliable, that we have no hesitation in recommending every gardener to read it. We are glad to see the writer advocates manuring asparagus beds in February instead of in the autumn, and that all "cutting" of asparagus should cease by Midsummer Day. Thousands of beds are ruined by cutting too late; and again, autumn manuring is of little value, as all the salts in the manure are washed away by winter rains before any roots can derive any benefit. We would suggest an index in the next edition.

"Fruit Ranching in British Columbia." By J. T. Bealby, M.A. 8vo., 196 pp. (Black, London, 1909.) 3*s.* 6*d.* net.

The magnificent apples exhibited at the Royal Horticultural Society's Colonial Shows in London since 1904 have directed much attention to British Columbia as the producer of the finest apples from any colony. Their size, splendid colour, and excellent flavour have always secured them a Gold Medal. This naturally caused the eyes of intending fruit growers to turn to British Columbia as a great field for fruit culture, many going out, and others seriously thinking of doing so, and all such should read carefully Mr. Bealby's book. It is the experience of a man who is actually a fruit-grower in British Columbia, and who has worked sufficiently long in the colony to enable him to speak with authority on the subject. Moreover he has found it a pleasant and profitable occupation. The author lays down and later on dilates upon the following facts:—(1) British Columbia produces some of the very finest apples grown anywhere in the world; (2) fruit-growing can be, and is, carried on successully as a commercial enterprize; (3) the life is interesting, pleasant, and, after the first year or so, easy; (4) the fruit-ranch affords a satisfactory escape from the stress and strain of city life, and gives an added dignity and freedom to one's sense of individuality.

We do not think the statements of returns are at all exaggerated, viz. £70 to £80 from an acre as a gross average, and the net annual profit £25 to £30 from an acre for an orchard nine years old. More than this has been made in Britain, but there is always a difficulty in getting small quantities of good land adapted for fruit-culture in this country, and while we still feel convinced that fruit-growing will pay in this country provided one can get the right kind of land, it is probably more easy to acquire it at a moderate cost in British Columbia. The book is well written and well printed, and the illustrations are good, but it lacks an index.

"In a Yorkshire Garden." By Reginald Farrer. Demy 8vo., 316 pp. (Edward Arnold, London, 1909.) 10*s.* 6*d.* net.

All Mr. Farrer's books on hardy plants, rock gardens, &c., have been full of interesting instruction, but in our opinion his last work on his own garden in Yorkshire is the best, and will be read by all hardy-plant growers more greedily than any of his other books, interesting as they are. The major portion is devoted to rock plants, and is so well written that no one will be puzzled by too technical terms. Naturally a writer like Mr. Farrer keeps back no secrets of how he succeeds with plants difficult to grow, but supplies the information fully, nor does he hide his failures, by which one usually learns more than by one's successes. Very few people know much about the rarer forms or varieties of Primulas, but those who like this beautiful class of plants will find a most interesting chapter on both the well-known and the scarcer kinds. In brief, all who possess a garden of moderate or large size should read this very delightful book, which is well indexed.

"Spring Flowers at Belvoir Castle." By W. H. Divers. sm. 4to., 110 pp. (Longmans, London, 1909.) 5*s*. net.

The Spring bedding at Belvoir Castle has been famous for many years, and is frequently quoted and written about in the Horticultural press. Even those who annually fill their flower-beds with spring flowering plants will be astonished to find what a vast number of plants, grasses, bulbs, &c., are available for this purpose. Excellent advice is given on the cultivation, planting, grouping for effect, and other items of interest and value for those who desire early spring flowers.

"The Small Garden Useful." By A. C. Curtis. 8vo., 206 pp. (Smith, Elder, London, 1909.) 3*s*. 6*d*. net.

Very few books on elementary gardening are so well written, and of such value to the perplexed amateur, as this work. It is thoroughly practical, and shows lucidly how Mr. Curtis manages his own garden very successfully. And we can confidently recommend the book to every amateur gardener, who will be sure to read it with pleasure, and gain a vast amount of valuable information from its pages, which are well printed and illustrated.

"The Small Garden Beautiful." By A. C. Curtis. 8vo., 155 pp. (Smith, Elder, London, 1909.) 3*s*. 6*d*. net.

This is a companion work to "The Small Garden Useful" and, like that book, it is admirably practical, and contains plans and illustrations of how to make a garden beautiful, and the cost of doing it, which will be of immense assistance to the amateur about to make his own flower-garden. Very good lists of plants, trees, shrubs, bulbs, &c., to grow are given, and vegetables are not omitted. This book will be particularly serviceable to the suburban gardener.

"The Children's Book of Gardening." By Mrs. Alfred Sidgwick and Mrs. Paynter. 8vo., 235 pp. (Black, London, 1909.) 6*s*. net.

Probably this is the only book of its kind written for children, and the authors have admirably carried out the idea, so that any young reader may easily carry out the suggestions made. Such a book has been wanted for some time, as the love of gardening is now fully as deep in young people as in their elders; and we have frequently been asked what is the best book to give a boy or girl on gardening. Some of the leading subjects are: Soil, Situation, Annuals, Perennials, Bulbs, Corms, Biennials, Roses, Carnations, Lilies, Rock Gardens, Fruit, Vegetables, a first-rate Calendar of work, &c. Even with all this fund of information, all is within the limits of what a child can do.

"Monthly Gleanings in a Scottish Garden." By L. H. Soutar. 8vo., 192 pp. (Fisher Unwin, London, 1909.) 6*s.* net.

This admirably written, well printed, and nicely illustrated book is more suited for northern readers than for those situated in the south. Still even the southern reader will be interested in the monthly gleanings. The observations, legends and poetry make a delightful book.

"The Book of the Sweet Pea." By D. B. Crane. 8vo., 136 pp. (Lane, London, 1910.) 2*s.* 6*d.* net.

The sweet pea has so many devotees that, in spite of the great mass of literature on this extremely popular flower, room will be found for this comprehensive work. A very complete list of books on the sweet pea is given. The culture of sweet peas under glass, in pots, tubs, and in the open, and the best varieties are dealt with, and a vast amount of other serviceable and interesting information is given.

"The British Fern Gazette." Edited by C. T. Druery, V.M.H. 8vo., 24 + 24 pp. (British Pteridological Society, Kendal, 1909.)

Lovers of ferns will welcome this little quarterly, two parts of which lie before us. The first is entirely from the pen of that prolific writer on ferns, the Editor, but in the second he has enlisted the aid of several of his fellow members of the Pteridological Society, whose organ this is. The articles include lists of sports and varieties raised from spores, accounts of fern-hunting expeditions, and so on.

DAHLIAS AT WISLEY, 1909.

ONE HUNDRED AND NINE stocks of Dahlias were grown for trial in the Garden, the object of the trial being to ascertain the value of the plants for garden decoration. Those varieties that do not throw their flowers well above the foliage are, of course, useless for this purpose. All the stocks were planted out the first week in June, and although good plants were put out scarcely any growth was made until August, when all made excellent growth, and flowered profusely late in the season. The paeony-flowered section formed a grand mass of colour, and for effect in the garden were much superior to any other section. There can be no question as to the value of this class, but to enable them to display their habit and beauty to the best advantage plenty of space should be given for each plant, not less than four or five feet apart each way. A moderate application of manure to the soil before planting, and a mulch of manure when they commence to blossom, are of great assistance to them.

LIST OF VARIETIES.

*1. Mrs. F. Bright.
2. Frances Graham.
3. Snowball.
4. Arabic.
5. Pompadour.
6. Sentinel.
7. Antagonist.
8. Baron de Grancy.
9. Careless.
10. Corpilla.
11. Délice.
12. Duke Henry.
13. Dr. Van Gorkom.
14. Fanny.
15. Glenton.
16. Grenadier.
17. High Sheriff.
18. Hugo de Vries.
19. Ironmonger.
20. Jeanne Charmet.
21. King Leopold.
22. La Riante.
23. Leveller.
24. Madame H. Charmet.
25. Magnet.
26. Monarch.
27. Nelly Hemsley.
28. Paul Kruger.
29. Peru.
30. Porcupine.
31. Princess Royal.
32. Queen Emma.
33. Queen Wilhelmina.
34. Solfatara.
35. Belchen.
36. Feldberg.
37. Hohenstaufen.
38. Hohentinel.
39. Kneibis.
40. Libanon.
41. Lugspitze.
42. Mont Blanc.
43. Neuffen.
44. Riese von Stuttgart.
45. Teck.
46. Watzmann.

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* All trials in the Wisley Garden are carried out under number only until judging is completed. The number prefixed to the name of the variety in the Report corresponds with that by which alone the variety was known until judgment had been given. Fellows visiting the Garden and noticing any plant under a number can easily ascertain its name later by reference to the Report in the JOURNAL.

47. Sea Shell.
48. Sevenoaks Scarlet.
49. Ruth Forbes.
50. Attraction.
51. Député Ch. Couyba.
52. Zarte Aster.
53. Rosini Cartins.
54. Madame Gladstone.
55. Reine Hortense.
56. Sainte-Mande.
57. Caprice.
58. Van Dyck..
59. Ville d'Anduze.
60. Artist.
61. Burne Jones.
62. Liberty.
63. Millais.
64. Rembrandt.
65. Raphael.
66. Rubens.
67. Ruskin.
68. Titian.
69. Van Dyck.
70. Arthur Kerley.
71. Donald.
72. Ladybird.
73. Peacemaker.
74. Prefect.
75. Sunset.
76. Baroness Truckhein.
77. Codsall Gem.
78. Col. K. St. G. Wilcox.
79. Countess Lonsdale.
80. Hon. Mrs. Howard.
81. John E. Faire.
82. Lady Cleeve.
83. Lady H. Drummond.
84. Lady M. Paget.
85. Lady Norman.
86. Lady Savile.
87. Lord Elphinstone.
88. Mrs. A. Gilroy.
89. Mrs. A. Mackellar.
90. Mrs. A. Worsey.
91. Mrs. Carter Lewis.
92. Mrs. G. Drummond.
93. Mrs. H. C. Holder.
94. Mrs. J. Chamberlain.
95. Mrs. R. Cooke.
96. Mrs. T. G. Baker.
97. Mrs. W. E. Whinery.
98. Mrs. W. Kerr.
99. Mrs. Keeling.
100. Viscount Newport.
101. Viscount Wolverhampton.
102. W. H. Morter.
103. No. 47.
104. No. 93.
105. No. 195.
106. No. 119.
107. No. 189.
108. No. 214.
109. No. 279.

Received under number only.

Paeony-Flowered Varieties.

7. Antagonist (Hobbies).—Rich orange-scarlet, flushed apricot at base of florets, with rosy-magenta reverse ; flowers large, drooping. 3½ feet.

60. Artist (West).—Pale mauve, tinged yellow at base of florets ; stems weak. 2½ feet.

8. Baron de Grancy (Hobbies).—White, faintly tinged cream ; very free-blooming, and of bushy habit. 3 feet.

76. Baroness Truckhein (Bakers).—Pale rosy-magenta, faintly tinged greenish-yellow at base of florets ; flowers ragged ; stems rigid ; very free-flowering. 3 feet.

35. Belchen (Pfitzer).—Buff, heavily marked scarlet ; flowers very full. 2½ feet.

61. Burne Jones (West).—Deep mauve, much tinged yellow at base of florets ; small, full flowers. 3½ feet.

9. Careless (Hobbies).—Pale mauve, deepening towards centre ; stems long, rigid ; a showy variety. 4 feet.

77. Codsall Gem (Bakers).—Rich chrome yellow; florets somewhat twisted; flowers held erect, on long rigid stems; very free and showy. 3½ feet.

78. Col. K. St. G. Wilcox (Bakers).—Creamy white, tinged with pale rosy-magenta, especially on the outer florets; flowers good, freely produced, and borne on rigid stems. 3½ feet.

79. Countess of Lonsdale (Bakers).—Mauve, heavily tinged rosy, scarlet; flowers large, loose; a showy variety. 3½ feet.

13. Dr. Van Gorkom (Hobbies).—White, flushed rose; weak plant, and large rough flowers. 2½ feet.

12. Duke Henry (Hobbies).—Rich orange-scarlet; large flowers. 3 feet.

14. Fanny (Hobbies).—Pale yellow, flushed apricot at tips of florets; stems very rigid for a paeony-flowered variety. 2½ feet.

36. Feldberg (Pfitzer).—Pure white, faintly tinged with yellow at base of florets. 3 feet. Inferior to 33, Queen Wilhelmina.

15. Glenton (Hobbies).—Yellow, heavily tinged buff; in some flowers the florets were edged with red; flowers very full; growth weak. 3 feet.

17. High Sheriff (Hobbies).—Yellow, slightly tinged with orange-scarlet; late. 2½ feet.

37. Hohenstaufen (Pfitzer).—Rich yellow; large flowers, freely borne on stiff stems. 3 feet.

38. Hohentinel (Pfitzer).—Deep chrome-yellow with apricot reverse; flowers very large. 3 feet.

80. Hon. Mrs. Howard (Bakers).—Pale rose, heavily tinged with rosy-scarlet; very free-blooming, and showy. 3½ feet.

19. Ironmonger (Hobbies).—Pale mauve, shaded with a deeper colour; flowers large, with very weak stems; late. 3 feet.

20. Jeanne Charmet (Hobbies).—Mauve, deeper at the edge of the florets, and tinged yellow at base; flowers large, on weak stems. 2½ feet.

81. John E. Faire (Bakers).—Deep rosy magenta; flowers medium-sized, freely borne on stiff stems; a showy variety. 4 feet.

21. King Leopold (Hobbies).—Pale chrome-yellow; flowers large, freely produced; stems long, rigid. 3½ feet.

82. Lady Cleeve (Bakers).—Ground colour yellow, but this is almost entirely hidden by pale rosy-magenta shading, and rosy-scarlet marks at base of florets. 4½ feet.

83. Lady K. Drummond (Bakers).—Mauve, with much yellow round the eye; flowers medium-sized, on stiff stems; habit good. 5 feet.

84. Lady M. Paget (Bakers).—Practically the same as 83.

85. Lady Norman (Bakers).—Mauve, shading rosy-magenta towards centre; flowers large, full. 6 feet.

86. Lady Savile (Bakers).—Ground colour apricot, much tinged with rosy-scarlet, and with a distinct tinge of rosy-magenta at edges of the florets; flowers large, neat. 6 feet.

23. Leveller (Hobbies).—Rich rosy-scarlet; flowers large, drooping, but nevertheless the plant is showy. 3 feet.

40. Libanon (Pfitzer).—Pure white, slightly tinged yellow at base of florets; flowers large, very freely produced; habit good. 3½ feet.

62. Liberty (West).—Rosy-scarlet; flowers large, loose, on weak stems. 4 feet.

87. Lord Elphinstone (Bakers).—Rosy-magenta, shading to crimson towards the eye; florets pointed; stems weak. 3½ feet.

41. Lugspitze (Pfitzer).—Yellow, tinged apricot; flowers loose, weak. 2 feet.

25. Magnet (Hobbies).—White, marked rosy-magenta; large flowers, borne on long weak stems; did not flower till the middle of October. 3 feet.

63. Millais (West).—Mauve, slightly deeper towards eye; stems weak; showy. 4 feet.

26. Monarch (Hobbies).—White, tipped mauve, and tinged yellow at base of florets; flowers small. 3½ feet.

42. Mont Blanc (Pfitzer).—Pure white; flowers large, full; florets round eye quilled. One of the best. 3 feet.

88. Mrs. A. Gilroy (Bakers).—Mauve; flowers rather loose; habit good. 3½ feet.

89. Mrs. A. Mackellar (Bakers).—Salmon, tinged yellow; florets somewhat pointed; stems long, rigid. 5 feet.

90. Mrs. A. Worsey (Bakers).—Rich rosy-scarlet; flowers large drooping, stems long, weak; poor habit. 4½ feet.

91. Mrs. Carter-Lewis (Bakers).—Pale mauve; flowers medium-sized; good bushy habit. 3½ feet.

92. Mrs. G. Drummond (Bakers).—Ground colour yellow, tinged pale salmon, especially on the reverse; very free-blooming and showy. 4½ feet.

93. Mrs. H. C. Holder (Bakers).—Ground colour yellow, almost entirely covered by rosy-scarlet; flowers large, held well up on stiff stems; showy. 6 feet.

94. Mrs. J. Chamberlain (Bakers).—Salmon, shading to yellow towards the eye; flowers medium-sized, borne on stiff stems. 4½ feet.

99. Mrs. Keeling (Bakers).—Same colour as 94, but flowers smaller; very freely produced, and borne on rigid stems. 3 feet.

95. Mrs. R. Cooke (Bakers).—Pale rosy-magenta, shading deeper towards the eye; flowers very full, on weak stems. 5 feet.

96. Mrs. T. G. Baker (Bakers).—Pure white, tinged with yellow in centre; flowers large, very freely produced on long stiff stems. The best white. 5 feet.

97. Mrs. W. E. Whinery (Bakers).—Deep mauve; flowers large. A showy variety. 4½ feet.

98. Mrs. W. Kerr (Bakers).—White, tipped with pale mauve; florets somewhat twisted. 5 feet.

45. Neuffen (Pfitzer).—Buff, tinged light red, and edged pale rose; with magenta reverse; flowers medium-sized. 2½ feet.

28. Paul Kruger (Hobbies).—Pale rosy-magenta, much tinged deep rosy-magenta; flowers long, borne on stiff stems. 3 feet.

29. Peru (Hobbies).—Rich scarlet, tinged crimson; flowers small. 2½ feet.

30. Porcupine (Hobbies).—Deep mauve, tinged yellow at base of florets; flowers large. 3 feet.

31. Princess Royal (Hobbies).—Deep mauve, tinged yellow; flowers large, full, on weak stems. 3 feet.

32. Queen Emma (Hobbies).—Mauve with a yellow zone round eye, the yellow colour diffusing somewhat; flowers very large, but stems weak; showy. 3½ feet.

33. Queen Wilhelmina (Hobbies).—Creamy white, with a trace of mauve on the reverse of the florets; flowers large; very showy. 3 feet.

65. Raphael (West).—Rich rosy magenta, with white base, and mauve reverse. 4 feet.

64. Rembrandt (West).—Mauve, with a trace of yellow; large, full flowers, on very weak stems; a vigorous grower. 4 feet.

44. Riese von Stuttgart (Pfitzer).—Rosy-crimson; stems weak. A peculiarity of this variety is its foliage, which is much more finely cut than the ordinary Dahlia leaf. 4½ feet.

66. Rubens (West).—Mauve, heavily tinged with yellow at the base of each floret; stems weak; habit bushy, and a vigorous grower. 4 feet.

67. Ruskin (West).—Pale mauve, heavily tinged rosy-magenta, and lined crimson; stems very long and rigid. 4½ feet.

34. Solfatara (Hobbies).—Rich rosy-scarlet, with broad buff zone round the eye; very rigid stems, which display the blooms to the best advantage; very showy. 3½ feet.

68. Titian (West).—Rich rosy-magenta; flowers hidden in the very vigorous foliage. 4 feet.

69. Van Dyck (West).—Mauve, heavily tinged apricot round centre; flowers very large, borne on long, weak stems. 5 feet. (Another variety, called 'Van Dyck,' was received. See p. 435.)

59. Ville d'Anduze (Vilmorin).—Petals buff, heavily tinged with scarlet, and splashed deep crimson; very free-flowering, and vigorous; foliage much cut. 4½ feet.

100. Viscount Newport (Bakers).—Ground colour yellow, but this is nearly covered up by rosy-magenta splashings; the tips of some florets mauve: flowers poor, loose. 3 feet.

101. Viscount Wolverhampton (Bakers).—Rosy-magenta, with a deeper colour at the tip of each floret: flowers freely produced on stiff, stout stems. 5 feet.

102. W. H. Morter (Bakers).—Ground colour yellow, almost hidden, except at the tips and base, with bright-scarlet. 2½ feet.

103. No. 47 (Bakers).—Yellow, upper half of florets heavily marked rosy-scarlet; flowers well formed, on stiff stems. 5 feet.

104. No. 95 (Bakers).—White, faintly tinged mauve at base of florets; flowers hidden in the foliage. 5 feet.

105. No. 195 (Bakers).—Deep yellow, shaded reddish-orange; flowers very small. 3 feet.

106. No. 119 (Bakers).—Scarlet, tinged yellow near eye; plant vigorous, bushy; flowers loose. 4½ feet.

107. No. 189 (Bakers).—Mauve, tinged yellow in centre; the yellow colour diffusing somewhat through the florets; showy. 4½ feet.

108. No. 214 (Bakers).—Yellow, very heavily shaded salmon; flowers small, but very freely produced. 3½ feet.

109. No. 279 (Bakers).—Rich chrome yellow; stems rather weak; very free-flowering. 4½ feet.

VARIOUS TYPES.

4. Arabic (Clark).—Failed to flower.

70. Arthur Kerley (H. Williams).—Rich crimson, with a trace of rose in the older petals: pompon; flowers held well erect. 2½ feet.

50. Attraction (Vilmorin).—White, tinged scarlet; flowers single, 4 inches in diameter. 2 feet.

57. Caprice (Vilmorin).—White, heavily marked rich rosy-magenta; flowers single, large. 3½ feet.

10. Corpilla (Hobbies).—Pale rose, striped deep rosy-magenta; a decorative variety; habit bushy. 2½ feet.

11. Délices (Hobbies).—Rosy-mauve; flowers borne on stiff stems; habit bushy. 2½ feet.

51. Député Ch. Couyba (Vilmorin).—White, heavily marked crimson at edges of florets, and tinged yellow at base; flowers single, borne on stiff stems; a showy variety. 4 feet.

71. Donald (K. Williams).—Scarlet; a very free-flowering pompon, with a bad centre when fully out; stems long, stiff, holding flowers well above the foliage. 3 feet.

2. Frances Graham (Carter Page).—Yellow, tipped salmon; cactus-flowered type; flowers drooping, hidden in the foliage; florets broad, slightly curved. 3 feet.

16. Grenadier (Hobbies).—Salmon, tinged yellow at base of florets; small cactus; florets very broad. 2 feet.

8. Hugo de Vries (Hobbies).—Apricot, heavily tinged crimson round eye, the crimson changing to magenta with age; single. 2½ feet.

39. Kniebis (Pfitzer).—Chrome yellow, heavily flushed scarlet; single, and very showy.

72. Ladybird (K. Williams).—Scarlet, tinged orange-chrome at base of florets; a very free pompon variety, with flowers of excellent form; very bushy plant. 3 feet.

22. La Riante (Hobbies).—Mauve; single; weak plant. 3 feet.

54. Madame Gladstone (Vilmorin).—Creamy-white, outer florets tinged rose; a show variety, with well-formed flowers, borne on long, stiff stems. 3 feet.

24. Madame H. Charmet (Hobbies).—Failed to flower.

1. Mrs. F. Bright (Bright).—Scarlet; a cactus variety, with flowers hidden in the leaves; florets broad, somewhat curved; bushy habit. 2 feet.

27. Nelly Hemsley (Hobbies).—Rich crimson, with white tips to the florets; cactus flower, good centre. 2 feet.

73. Peacemaker (K. Williams).—White; a pompon variety, with well-formed flowers, very freely produced. 2 feet.

5. Pompadour (W. H. Divers).—Deep crimson; a free-flowering decorative, with flowers held well above the foliage on stiff stems; bad centre. 3 feet.

74. Perfect (K. Williams).—White, tinged with mauve at edges of florets, and faintly tinged yellow in centre; pompon; very free. 2½ feet.

55. Reine Hortense (Vilmorin).—Apricot, tipped with scarlet, with rosy-magenta reverse to florets; a 'show' variety. 2½ feet.

53. Rosini Cartins (Vilmorin).—Rosy-magenta, tinged at base of florets with apricot; a very free-flowering pompon, of bushy habit. 2½ feet.

49. Ruth Forbes (W. T. Turner).—Rosy-magenta; cactus flowers; florets broad, slightly curved; weak stems. 4½ feet.

56. Sainte-Mande (Vilmorin).—Lilac-magenta, with spots and stripes of crimson; single; florets broad, and of good substance. 2½ feet.

47. Sea Shell (Seale).—Salmon-rose, tipped with white; a decorative variety with small flowers freely produced. 3½ feet.

6. Sentinel (Dobbie).—Chrome yellow, tinged with buff on outer florets; cactus type; florets straight; bad centre. 2 feet.

48. Sevenoaks Scarlet (Seale).—Rich orange-scarlet; flowers small, decorative, very freely produced. 3 feet.

3. Snowball (Chapman). Creamy white on opening, with a yellow base to florets, but with age becoming tinged with rose; single; very free-blooming, and flowers on stiff stems. 4½ feet.

75. Sunset (K. Williams).—Orange-scarlet; a pompon variety, with flowers freely produced on stiff stems. 4 feet.

45. Teck (Pfitzer).—Failed to flower.

58. Van Dyck (Vilmorin).—Orange-yellow, tinged rose, and splashed deep crimson-maroon; single flowers on good stems; very free. 3½ feet. (See also this name under paeony-flowered varieties, p. 433.)

46. Watzmann (Pfitzer).—Rich scarlet, tinged with yellow near eye; single cactus. 3½ feet.

52. Zarte Aster (Vilmorin).—White, tinged cream at base of florets; pompon; florets distinctly 3-toothed; very vigorous and free. 3½ feet.

PENTSTEMONS AT WISLEY, 1909.

One hundred and ninety stocks of Pentstemons were planted for trial at the end of May in good soil that had been previously well cultivated and moderately manured. The great majority made excellent growth and blossomed profusely. The collection generally showed a marked improvement on the old type; the spikes being longer, the flowers larger, and including many new shades of colour: No. 184—"Schwester Sophie," practically a pure white, was especially admired. The Floral Committee examined the collection on three occasions.

A.M.=Award of Merit.
XXX=Highly commended.

Varieties.

*1. Autumn Glory.
2. Bianca.
3. Bonny Lass.
4. Born in the Purple.
5. Clad in Beauty.
6. Dr. Webb.
7. Friendship's Pledge.
8. Helen of Troy.
9. In Scarlet Array.
10. Love's Guerdon.
11. Mdlle. de Vilmorin.
12. Mistress Mine.
13. Pride of Life.
14. Prima Donna.
15. Proud Maisie.
16. Purple Emperor.
17. Queen's Daughter.
18. Virgo Intacta.
19. Agnes Wickfield.
20. Alexander Anderson.
21. Amédie Jaurie.
22. Andrew Carnegie.
23. Annie Balfour.
24. Arabella.
25. Atlantis.
26. Border Chief.
27. Britannia.
28. Chinoisière.
29. Clio.
30. Constance.
31. Constance Gordon.
32. Countess of Minto.
33. Dr. Barrie.
34. Duchess of Cornwall.
35. Earl of Dalkeith.
36. Edward Tate.
37. Ellen Terry.
38. Emile Radigas.
39. Excelsior.
40. Gerard Mercator.
41. George Home.
42. Gregor Mendel.
43. Herbert Spencer.
44. Homer.
45. John Forbes.
46. King Edward.
47. Lady Ogilvy.
48. Lord Kelvin.
49. Lord Rosebery.
50. Lord Salisbury.
51. Malcolm Dunn.
52. Mars.
53. Miss Cunningham.
54. Mrs. B. Cowan.
55. Mrs. Jeffrey.
56. Mrs. Oliver.
57. Mrs. Wells.
58. Neil Gow.
59. Newbury Gem.
60. Nizza.

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* See footnote, p. 429.

61. Paul Cambon.
62. Paul Verlane.
63. Phrynne.
64. Princess Alexandra.
65. Prof. de Arsonval.
66. Provost Hunter.
67. Queen Alexandra.
68. Rebecca.
69. Satin Rose.
70. Sir R. Giffen.
71. Sir W. Giffen.
72. Sir W. Scott.
73. Solomon Reinach.
74. Stéphanie Leduc.
75. Surprise.
76. Talma.
77. Zacharia Nemmo.
78. A. J. Allsop.
79. A. J. Ward.
80. Albino.
81. Alphonso.
82. Alexander Brown.
83. Balmoral.
84. Arthur Radiguet.
85. Charles Lunn.
86. Charles Dickens.
87. Colonel Seely.
88. Colonel Hope.
89. Crimson Gem.
90. Daniel Bellet.
91. Dr. Barrie.
92. Dr. Carpentier.
93. Dr. Maragliano.
94. Dragoon.
95. Duke of Marlborough.
96. Emile Radigas.
97. Ernest Bichat.
98. F. Schaudinn.
99. Garth.
100. George Home.
101. Gen. White.
102. Gregor Mendel.
103. Henry Farman.
104. Henry Kapferer.
105. Henry Lachambre.
106. Henry Parr.
107. Henry Poincare.
108. Hermine Wigan.
109. Hilda Stevenson.
110. Jacques Bertillon.
111. James Hamilton.
112. James Kennan.
113. Jane Dieulafoy.
114. Jessie Forbes.
115. John A. Elliot.
116. John Deacon.
117. John Forbes.
118. John Jennings.
119. John Lamont.
120. John Michie.
121. Joseph Chamberlain.
122. Kathleen.
123. Lady Arthur.
124. Lady Clementine Waring.
125. Lady Downes.
126. Lady Forbes.
127. Lady Love.
128. Lady Morrison Bell.
129. Lady Noble.
130. Lady Windsor.
131. Leonnec.
132. Lewis D. Wigan.
133. Lord Lister.
134. Lord Milner.
135. Marcel Dubois.
136. Marquis of Linlithgow.
137. Marchioness of Tweeddale.
138. Mirando.
139. Miss Stewart Peter.
140. Mrs. Alexander Brown.
141. Mrs. Callender.
142. Mrs. D. McAinsh.
143. Mrs. Forbes.
144. Mrs. H. Thompson.
145. Mrs. Irvine.
146. Mrs. J. Hamilton.
147. Mrs. J. Keenan.
148. Mrs. J. Chamberlain.
149. Mrs. Michie.
150. Mrs. Nicol.
151. Mrs. Oliver.
152. Mrs. Robertson.
153. Mrs. Younger.
154. M. Millardet.
155. Parachute.
156. Paul Cambon.
157. Peach.
158. Peter Readman.
159. Phrynne.
160. Professor Pozzi.

161. Rabelais.
162. Radium.
163. R. Heywood Thompson.
164. Sandringham.
165. Sir Dighton Probyn.
166. Sir T. S. Bayley.
167. Solomon Reinach.
168. Stéphanie Leduc.
169. Talma.
170. The Paddock.
171. Thomas Harvey.
172. Thos. H. Cook.
173. Walter Thompson.
174. Wm. Bull.
175. Wm. Oliver.
176. Wm. Robb.
177. No. 75.
178. Albert Borrée.
179. Erna Bandell.
180. Fräulein Anna Drewald.
181. Fräulein Anna Schlayer.
182. Lore Vottler.
183. Pfarrer Roemer.
184. Schwester Sophie.
185. Myddelton Gem.
186. Dobbie's mixed.
187. Forbes' hybrid mixed.
188. Carter's choice mixed.
189. Lullingstone Castle strain.
190. Gloxinioides.

19. Agnes Wickfield (Dobbie).—Pale rosy-carmine, with a white throat; flowers small.

78. A. J. Allsop (Forbes).—Pale rosy-magenta, with white throat; flowers small; good spike.

79. A. J. Ward (Forbes).—Magenta, with a pure white throat; flowers large; good spike; showy.

178. Albert Borrée (Pfitzer).—Crimson, with a white throat, slightly tinged with rose; flowers large; very free and vigorous.

80. Albino (Forbes).—Pure white, with a faint edge of soft lilac; flowers large: good tall spike; very pretty, and one of the best.

20. Alexander Anderson (Dobbie).—Failed.

82. Alexander Brown (Forbes).—Rich crimson, with well-defined white throat, faintly tinged with magenta; flowers rather small, but of good form.

81. Alphonso (Forbes).—Pale rosy-scarlet, with a white throat, lined with rose; flowers medium sized; good spike.

21. Amédie Jaurie (Dobbie).—Failed.

22. Andrew Carnegie (Dobbie).—Rosy-scarlet, with a white throat tinged with rose; flowers large, of good substance; showy.

23. Annie Balfour (Dobbie).—Failed to flower.

24. Arabella (Dobbie).—Failed to flower.

84. Arthur Radiguet (Forbes).—White, lower petals tinged with rose; flowers large, of good form; good spike.

25. Atlantis (Dobbie).—Rich crimson, with a white throat lined with crimson; flowers small, but of excellent form; very pretty.

1. Autumn Glory (Gibbs).—Rosy-scarlet, suffusing into the white throat; outside of tube brighter in colour; flowers of medium size; very freely produced, on a good spike.

83. Balmoral (Forbes).—Rosy-magenta with a pure white throat; flowers of medium size; good spike.

2. Bianca (Gibbs).—White, faintly tinged with cream, with a rose edge to the petals; flowers large; tall, bold spike.

3. Bonnie Lass (Gibbs).—Pale rosy-scarlet, with a white throat; flowers large; tall spike.

26. Border Chief (Dobbie).—Pale rosy-scarlet, with well-defined pure white throat; flowers of medium size; loose spike.

4. Born in the Purple (Gibbs).—Failed to flower.

27. Britannia (Dobbie).—Crimson with a white throat lined with crimson; flowers small, but of excellent form; very pretty.

188. Carter's choice Mixed (Carter).—Very free-flowering, vigorous seedlings; many good colours, and well-formed flowers.

86. Charles Dickens (Forbes).—Scarlet, with a white throat, heavily lined with scarlet; flowers of medium size, freely produced on good spikes; showy.

85. Charles Lunn (Forbes).—Magenta, with a white throat, faintly lined with magenta, and with a maroon blotch at the mouth; flowers large; good tall spike.

28. Chinoisière (Dobbie).—Rosy-magenta, with a white throat lined with magenta; flowers small.

5. Clad in Beauty (Gibbs), **XXX** August 12, 1909.—Scarlet, with a white throat tinged with rose; flowers medium-sized; good spike.

29. Clio (Dobbie).—Rosy-scarlet with a white throat lined with magenta; flowers large.

88. Col. Hope (Forbes).—White, edged with rosy-magenta; flowers medium-sized.

87. Col. Seely (Forbes).—Failed to flower.

30. Constance (Dobbie).—Rose, with a lined white throat; flowers small; very pretty.

31. Constance Gordon (Dobbie).—Failed to flower.

32. Countess of Minto (Dobbie).—White, with pale-rose petals; flowers small; weak spike. One of the earliest to flower.

89. Crimson Gem (Forbes).—Crimson-magenta, with a white throat lined with maroon; flowers medium-sized, of good form; tall spike.

90. Daniel Bellet (Forbes).—Failed to flower.

186. Dobbie's Strain (Dobbie), **A.M.** 1900.—Very vigorous plants, of good habit; flowers large, well formed; colours including all shades found in Pentstemons of this group.

33, 91. Dr. Barrie (Dobbie, Forbes).—Magenta, with a white throat lined with magenta; flowers large; good tall spike; a showy, vigorous variety.

92. Dr. Carpentier (Forbes).—Scarlet, with a white throat tinged magenta; flowers large; tall spike.

93. Dr. Maragliano (Forbes).—Scarlet, with a rosy-white throat. Did not bloom well.

6. Dr. Webb (Gibbs).—Pale rosy-scarlet, fading to pale magenta, with a creamy-white throat; flowers of medium size, good form and substance.

94. Dragoon (Forbes).—Deep rosy-scarlet, with white throat; lined rose; flowers of medium size; good spike.

34. Duchess of Cornwall (Dobbie).—Failed to flower.

95. Duke of Marlborough (Forbes).—Magenta, with a white throat, heavily lined and tinged with maroon; flowers large; tall, vigorous spike. Very showy.

35. Earl of Dalkeith (Dobbie).—Rosy-scarlet, with rose-white throat lined rose; flowers large; good bold spike.

36. Edward Tate (Dobbie).—Failed to flower.

37. Ellen Terry (Dobbie).—Failed to flower.

38. Emile Radigas (Dobbie).—Rosy-magenta with white throat lined with magenta; flowers medium-sized; tall spike.

96. Emile Radigas (Forbes).—Bright scarlet, with a distinct pure white throat; flowers of medium size; good spike.

179. Erna Bandell (Pfitzer).—Rosy-magenta, with a white throat lined with scarlet, and marked at mouth with maroon; flowers small.

87. Ernest Bichat (Forbes).—Deep magenta, shaded outside with crimson, with a clear white throat; flowers large, of good substance; very bold spike.

39. Excelsior (Dobbie).—Magenta, with a white throat lined with magenta; flowers medium-sized; tall spike.

187. Forbes' hybrid mixed (Forbes).—A magnificent strain. Habit good; flowers mostly large and of good substance; including all colours found in Pentstemons.

180. Fräulein Anna Drewald (Pfitzer).—White, edged with lilac; flowers large; good vigorous spike. Inferior to Albino, No. 80.

181. Fräulein Anna Schlayer (Pfitzer).—White, faintly tinged with cream, with a tinge of rose; flowers large, of good form; good spike.

7. Friendship's Pledge (Gibbs).—Rosy-magenta, throat white, lined magenta, surrounded by a zone of rich maroon; flowers medium-sized; good bold spike.

98. F. Schaudinn (Forbes).—Deep magenta, with a clear white throat; flowers large, of good substance; very bold, showy spike.

99. Garth (Forbes).—A very vigorous grower, but no flowers were produced.

101. Gen. White (Forbes).—Failed.

41, 100. George Home (Forbes, Dobbie).—Bright scarlet, with a pure white throat; flowers medium-sized, borne on a good spike.

40. Gerard Mercator (Dobbie).—Did not flower.

190. Gloxinioides (Carter).—Plants of good habit, vigorous; colours are very varied, and include many delicate shades.

42, 102. Gregor Mendel (Dobbie, Forbes).—Maroon red, with a pale rose throat, lined maroon; flowers of medium size; spike tall.

8. Helen of Troy (Gibbs).—Rosy-scarlet, with a white throat, tinged and lined with rose; flowers large; a very showy variety.

103. Henry Farman (Forbes).—Crimson, with a white throat, heavily lined with rose; flowers medium-sized; good spike.

104. Henry Kapferer (Forbes).—Deep magenta, with white throat, heavily lined magenta; flowers medium-sized.

105. Henry Lachambre (Forbes).—Very near to Henry Farman, but throat not quite so heavily lined.

106. Henry Parr (Forbes).—Rosy-magenta, with white throat, marked at mouth with crimson; flowers large, of good substance; spike good.

107. Henry Poincare (Forbes).—Deep magenta, heavily marked with maroon in the throat; flowers large.

43. Herbert Spencer (Dobbie).—Rosy-carmine, with throat heavily marked maroon; flowers small; spike tall.

108. Hermine Wigan (Forbes).—Rosy-scarlet, with white throat; flowers large; good spike, coming into flower very early.

109. Hilda Stevenson (Forbes). Pale rosy-scarlet, with a pure white throat; flowers large; a very showy, vigorous variety.

44. Homer (Dobbie).—Rosy-scarlet, with a white throat, lined with scarlet; flowers large; spike good.

9. In Scarlet Array (Gibbs).—Rosy-scarlet, with white throat, tinged with magenta, and lined with a deeper shade; very showy.

110. Jacques Bertillon (Forbes).—Crimson-maroon, with a heavily-lined throat, and a blotch of crimson at the mouth; flowers medium-sized; very branching habit, producing many spikes, which are individually weak.

111. James Hamilton (Forbes).—Rosy-magenta, with a pure white throat; flowers medium-sized; spike weak.

112. James Keenan (Forbes).—Rosy-scarlet, with a white throat, faintly lined with scarlet; flowers medium-sized; spike good.

113. Jane Dieulafoy (Forbes).—White, tinged with rose at the edges of the petals; flowers large; good tall spike. A very showy variety.

114. Jessie Forbes (Forbes).—Pale rose, with a pure white throat; flowers large; good spike.

115. John A. Elliot (Forbes).—Rich rosy-magenta, with white throat heavily lined with maroon; flowers large, of good form and substance, bold spike; very showy.

116. John Deacon (Forbes).—Rosy-magenta, with pure white throat; flowers large, very broad; bold spike.

117. John Forbes (Forbes).—Deep magenta, with white throat lined magenta, and a large crimson blotch at the mouth; flowers large.

45. John Forbes (Dobbie).—Rosy-carmine, with white throat lined with maroon; flowers small; spike weak.

118. John Jennings (Forbes).—Delicate mauve, with a pure white throat; good tall spike.

119. John Lamont (Forbes).—Bright scarlet, with a distinct pure white throat. Very near 96, but flowers larger.

120. John Michie (Forbes).—Failed to flower.

121. Joseph Chamberlain (Forbes).—Deep rosy-scarlet, with a white throat lined with rose; flowers large. Showy.

122. Kathleen (Forbes).—Rosy-magenta, with a white throat slightly tinged with rose; flowers medium-sized; plant weak.

46. King Edward (Dobbie).—Rosy-scarlet, with white throat lined with rose; flowers large, of good form; good tall spike.

123. Lady Authur (Forbes).—Rosy-scarlet, with white throat lined scarlet; flowers large. A vigorous grower.

124. Lady Clementine Waring (Forbes).—Rosy-scarlet, with a white throat lined with magenta; small flowers, but very freely produced.

125. Lady Downes (Forbes).—Creamy white, petals tinged with rose; and pure white throat; flowers small.

126. Lady Forbes (Forbes).—Pale rosy-scarlet, with a white throat; flowers large; tall spike.

127. Lady Love (Forbes).—Failed to flower.

128. Lady Morrison Bell (Forbes).—Rosy-scarlet, with a white throat lined with magenta; medium-sized flowers.

129. Lady Noble (Forbes). Rosy-magenta, with a white throat marked with scarlet; flowers medium-sized; spike weak.

47. Lady Ogilvy (Dobbie). Rosy-scarlet, with a white throat lined with rose; flowers large. Very much like King Edward, but not so vigorous.

130. Lady Windsor (Forbes).—Rosy-magenta, with a large blotch of maroon at the mouth, and a white throat; flowers large.

131. Leonnec (Forbes).—Rosy-scarlet, with a pure white throat; flowers large, borne on a bold spike. One of the best.

132. Lewis D. Wigan (Forbes).—Rosy-scarlet, with a white throat; flowers medium-sized; weak spike.

48. Lord Kelvin (Dobbie). Rich crimson-maroon, with a white throat heavily lined maroon. A very showy, vigorous variety.

133. Lord Lister (Forbes).—Rosy-crimson, with a well-defined white throat. Inferior to Solomon Reinach.

134. Lord Milner (Forbes).—Rosy-magenta, with a white throat lined with magenta; flowers large; spike fair. Plant badly attacked by mildew.

49. Lord Rosebery (Dobbie).—Pale magenta, throat tinged and heavily lined with maroon; flowers small, but spike good.

50. Lord Salisbury (Dobbie).—Failed.

182. Lore Vottler (Pfitzer).—White, petals tinged with rose; flowers small, of poor form; very tall spike. A good decorative variety.

10. Love's Guerdon (Gibbs).—Crimson, with a white throat lined with magenta, and surrounded by a zone of maroon; flowers of medium size; tall spike.

189. Lullingstone Castle strain (Dyke).—Flowers large, of good form; colours chiefly shades of magenta; plants of good habit, and very vigorous.

51. Malcolm Dunn (Dobbie).—Pale magenta, with white throat lined with magenta; flowers small; loose spike.

135. Marcel Dubois (Forbes).—Creamy white, petals edged with rose; flowers large; very bold, showy spike.

137. Marchioness of Tweeddale (Forbes).—Scarlet, with a white throat tinged with rose; flowers large.

136. Marquis of Linlithgow (Forbes).—Rosy-magenta, with a white throat, and a deep magenta blotch at the mouth; flowers of medium size; tall spike.

52. Mars (Dobbie).—Pale rosy-magenta, with a pure white throat; flowers large, of good form. One of the best.

11. Mdlle. de Vilmorin (Gibbs).—Pale rosy-magenta, with a white throat lined with maroon; flowers of medium size, well-formed; tall, bold spike.

53. Miss Cunningham (Dobbie).—Pale rosy-scarlet, throat heavily blotched and lined with maroon; flowers large; weak spike.

139. Miss Stewart Peter (Forbes).—Magenta, with a white throat slightly tinged with pale magenta; flowers of medium size, of very good form and substance; tall spike. A vigorous, showy variety.

138. Mirando (Forbes).—Rose, with a rose-white throat; flowers large.

12. Mistress Mine (Gibbs).—Bright scarlet, with white throat lined scarlet; flowers of good form; weak spike.

154. M. Millardet (Forbes).—Rich crimson, with white throat heavily lined maroon; flowers large; very large, showy spike.

140. Mrs. Alexander Brown (Forbes).—White, petals edged with rose; flowers large.

54. Mrs. B. Cowan (Dobbie).—Rosy-magenta, with a white throat heavily lined with maroon; flowers large; spike weak.

141. Mrs. Callender (Forbes).—Rosy-scarlet with a white throat having a few scarlet markings at the mouth; flowers large and very broad; good showy spike.

142. Mrs. D. McAinsh (Forbes).—Rosy-scarlet, shading to scarlet at the edges of the petals; throat white, faintly lined with scarlet. Flowers of medium size, borne on a fair spike.

143. Mrs. Forbes (Forbes).—Crimson, shaded with rose, and tinged magenta in the throat; flowers large; tall, weak spike; a vigorous grower.

144. Mrs. H. Thompson (Forbes).—Failed to flower.

145. Mrs. Irvine (Forbes).—Deep rose, with a white throat lined with scarlet; flowers large; good bold spike. A showy variety.

148. Mrs. J. Chamberlain (Forbes).—Rose, with a pure white throat; large flowers; spike good. A vigorous variety.

55. Mrs. Jeffrey (Dobbie).—Pale rosy-magenta, with a white throat slightly lined with magenta; poor spike.

146. Mrs. J. Hamilton (Forbes).—Magenta, with a white throat tinged magenta; flowers small; weak spike. 1½ feet.

147. Mrs. J. Keenan (Forbes).—Failed to flower.

149. Mrs. Michie (Forbes).—Rich scarlet, with rose-white throat; flowers of medium size borne on a bold spike.

150. Mrs. Nicol (Forbes).—Failed to flower.

56, 151. Mrs. Oliver (Dobbie, Forbes).—Rosy-scarlet, with a white throat tinged with scarlet; flowers of medium size; tall, bold spike.

152. Mrs. Robertson (Forbes.)—Rosy-scarlet, with a well-defined white throat; flowers of medium size; a vigorous grower but a shy flowering variety.

57. Mrs. Wells (Dobbie).—Failed.

153. Mrs. Younger (Forbes).—White, petals edged with magenta; flowers of medium size, very freely produced; a vigorous variety.

185. Myddelton Gem (Wallace), **A.M.** September 28, 1909. See Report of Floral Committee, September 28, 1909, p. ccxlviii.

58. Neil Gow (Dobbie).—Rosy-magenta, throat faintly lined magenta and marked maroon; flowers large; spike weak.

59. Newbury Gem (Dobbie).—Bright scarlet, with a white throat lined with rose; flowers small, but freely produced; very branching habit. 2 feet.

60. Nizza (Dobbie).—Failed to flower.

155. Parachute (Forbes).—Rosy-magenta, with a white throat lined with maroon; flowers large; spike good.

61. Paul Cambon (Dobbie).—Bright scarlet, with a white throat; flowers small; weak spike.

156. Paul Cambon (Forbes).—Magenta, with a white tube, faintly lined with magenta; flowers large; tall, much-branched plant.

62. Paul Verlane (Dobbie).—Failed.

157. Peach (Forbes).—White, edged with pale rose; flowers of medium size; plant weak.

158. Peter Readman (Forbes).—Pale rosy-scarlet, with a well-defined white throat; flowers of medium size; spike tall.

183. Pfarrer Roemer (Pfitzer).—Rosy-scarlet, with a white throat lined scarlet; flowers large, on a large dense spike. One of the best.

63 and 159. Phrynne (Dobbie, Forbes).—Bright scarlet, with well-defined, pure white throat; flowers large; fair spike. Inferior to John Lamont.

13. Pride of Life (Gibbs).—Rosy-scarlet, with a white throat lined with magenta, and surrounded by a band of maroon; flowers of medium size; weak spike.

14. Prima Donna (Gibbs).—Rose, with a white throat faintly tinged with rose; flowers large, of good form; good bold spike. One of the best.

64. Princess Alexandra (Dobbie).—Pale rosy-magenta, with rose-white tube; flowers large; good spike.

65. Prof. de Arsonval (Dobbie).—Failed.

160. Prof. Pozzi (Forbes).—Bright scarlet, with a white throat faintly tinged and lined with magenta; flowers cover 2 feet of the spike. A very showy variety; the best scarlet in the trial.

15. Proud Maisie (Gibbs).—Scarlet, with a white throat lined rosy-scarlet; flowers of medium size; good showy spike.

66. Provost Hunter (Dobbie).—Rosy-magenta, with a maroon-lined throat; flowers large; spike weak.

16. Purple Emperor (Gibbs).—Purple, with white throat lined with maroon; flowers large; dense, showy spike.

67. Queen Alexandra (Dobbie).—Pale rose, with a white throat; large flowers; spike poor.

17. Queen's Daughter (Gibbs).—Rose, with a white throat. Very near Prima Donna, but flowers slightly smaller, and of better form.

161. Rabelais (Forbes).—Failed.

162. Radium (Forbes).—Deep rosy-magenta, with a white throat with magenta veins; flowers small, but very freely produced.

68. Rebecca (Dobbie).—Failed.

163. R. Heywood Thompson (Forbes).—Pale rosy-magenta, with a white throat, blotched with magenta; flowers large, of good form, very freely produced on good bold spikes.

164. Sandringham (Forbes).—Scarlet, tinged with rose; throat white, lined scarlet; flowers of medium size, borne on a good bold truss.

69. Satin Rose (Dobbie).—White, edged with rose; flowers large; spike good.

184. Schwester Sophie (Pfitzer).—**XXX** August 12, 1909. Creamy-white, faintly tinged with rose; flowers large, of good form and substance; spike large. An early-flowering variety.

165. Sir Dighton Probyn (Forbes).—Scarlet, with a white throat delicately lined and shaded rose; flowers of medium size, frilled at the edges of the petals; long, loose spike.

70. Sir R. Giffen (Dobbie).—Failed.

166. Sir T. S. Bayley (Forbes).—Deep rose, with a white throat lightly lined with rose; flowers large. A showy variety.

71. Sir W. Giffen (Dobbie).—Rosy-scarlet, with a white throat lined with scarlet; flowers large, of good form; good spike.

72. Sir W. Scott (Dobbie).—Failed.

73, 167. Solomon Reinach (Dobbie, Forbes).—Crimson, with a good white throat; flowers of medium size, but very freely produced on tall spikes. Very showy.

74, 168. Stéphanie Leduc (Dobbie, Forbes).—Rich magenta, shaded maroon; throat white, tinged with magenta, and lined with scarlet; flowers large; good showy spike.

75. Surprise (Dobbie).—Rosy-scarlet, with a white throat lined with scarlet: flowers small; good spike.

76, 169. Talma (Dobbie, Forbes).—Pale magenta, with a white tube; medium-sized flowers; good spike.

170. The Paddock (Forbes).—Rosy-scarlet, with a white tube, faintly tinged and lined rose; flowers small; fair spike.

171. Thomas Harvey (Forbes).—Rosy-magenta, with a white throat faintly lined with magenta; flowers medium-sized.

172. Thomas H. Cook (Forbes).—Rosy-scarlet, with a white throat lined with scarlet; flowers large; plant weak.

18. Virgo Intacta (Gibbs).—Creamy-white, tinged with rose; medium-sized flowers. A very pretty variety. 1½ feet.

174. William Bull (Forbes).—Scarlet, with a white throat lined with scarlet; flowers of poor form; poor spike.

175. William Oliver (Forbes).—Deep rosy magenta, with a large maroon blotch at the mouth; flowers large; spike good.

176. William Robb (Forbes).—Same as 175.

173. Walter Thompson (Forbes).—Rosy-magenta, becoming deeper towards the edges of the petals; throat white; flowers large, on a good showy spike.

77. Zacharia Nemmo (Dobbie).—Mauve, with white throat lightly lined scarlet; flowers large; spikes many, but small.

PHLOXES AT WISLEY, 1908 AND 1909.

SEVEN hundred and fifty-one stocks of Phloxes were grown at Wisley during the years 1908 and 1909, thus testing the varieties for two years. All were planted in deeply dug and moderately manured soil, but not grown in the same soil in the second year. The majority of the plants made good growth. The forms of *Phlox suffruticosa* flowered in July and August, and it is to be hoped that this beautiful early-flowering class may become more widely known and grown, as they come into blossom at a season when herbaceous flowers are not plentiful.

F.C.C. = First Class Certificate.
A.M. = Award of Merit.
XXX = Highly Commended.
XX = Commended.

LIST OF VARIETIES.

1908	1909		1908	1909	
*1	*1	Balzac	32	29	Lady Hall
2	2	Boule de Feu	33	30	Louis Botha
3	—	Champignol	34	31	Mignonne
4	—	Countess of Mar	35	32	Nuée
5	3	Géant de Batailles	36	33	Evelyn
6	4	Gilbert	37	34	Elaine
7	—	Inaudi	38	35	Edith
8	5	Manon	39	36	Elizabeth
9	6	Parachute	40	37	Esmeralda
10	7	Cornelia	41	38	Mrs. Tilney
11	8	De Dombasle	42	39	Eleanor
12	9	Fantasy	43	40	Enid
13	10	Œil de Rouge	44	41	Amos Perry
14	11	Jules Jouey	45	42	Auricula Eye
15	12	Leonnec	46	43	Graf von Onwaroff
16	13	Stanislas	47	44	Carminea
17	14	Antonio Fogazzaro	48	45	Siebold
18	15	Argon	49	46	Etoile
19	16	Cherubim	50	47	Esclairmonde
20	17	Chopin	51	48	Sergent Lovy
21	18	Colonie	52	49	Plantagenet
22	19	Delarey	53	50	Mons. W. Bull
23	20	De Wet	54	51	Maupertuis
24	21	Epopée	55	—	Jas. Lemaire
25	22	Erebus	56	52	Lucy Baltet
26	23	Guignol	57	53	
27	24	Gustave Larroumet	58	—	
28	25	Hermione	59	54	Erinnye
29	26	Jocelyn	60	55	
30	27	John Brunton	61	56	Eugène Danzanvilliers
31	28	Joubert	62	57	

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* See footnote, p. 429.

1908	1909	
63	—	Emile Krantz
64	58	Comédie
65	59	
66	60	Chas. Flahault
67	61	
68	62	Amphitryon
69	63	Amiral Jaurès
70	64	
71	65	Paul Bert
72	66	
73	67	Papillon
74	68	Derviche
75	69	
76	70	
77	71	Colibri
78	72	Chanzy
79	73	Barblanegre
80	—	Favourite
81	74	Artaxis
82	75	
83	76	Le Mahdi
84	77	Emanuel de Rouge
85	78	Mrs. Butters
86	79	Lord Rayleigh
87	80	Le P. Hacquart
88	81	Iris
89	82	
90	83	
91	84	Edouard Lockroy
92	85	
93	86	Edmond Audran
94	87	
95	88	Dr. Charcot
96	89	
97	—	Renommé
98	90	W. Ramsay
99	91	Tunisie
100	92	Tivoli
101	93	
102	94	Tambour de Wattignies
103	95	Multiflore
104	96	M. Duponchel
105	97	Louis Blanc
106	98	
107	99	Jourdan
108	100	
109	101	Iona
110	102	Gomez
111	103	
112	104	Fantôme
113	105	
114	106	Etoile de Lyon
115	107	
116	108	E. Rostand
117	109	
118	110	Dr. Schleicher
119	111	Daniel Lesueur
120	112	
121	113	Croix de Malte
122	114	
123	115	Corneville
124	115	
125	117	Auguste Raffet
126	118	Rubis
127	119	Pierre le Grand
128	120	
129	121	Mrs. Brook
130	122	Jules Cambon
131	123	
132	124	Deuil de St. Pierre
133	125	
134	126	Zouave
135	127	
136	128	Torpilleur
137	129	Talma
138	130	Selection
139	131	Orientale
140	132	Jean Millet
141	133	Gustave Nadaud
142	134	
143	135	Geoffrey St. Hilaire
144	136	
145	137	
146	—	Rossignol
147	138	Paul Hariot
148	139	
149	140	Le Chemineau
150	141	Emmanuel Here
151	142	
152	143	Parachute
153	144	Offenbach
154	145	Royal Purple
155	146	Wm. Muir
156	147	Purple Emperor
157	148	Mrs. Younger
158	149	Major Houston
159	150	Massenet
160	—	
161	151	Lady Rollin
162	152	Ledru Rollin
163	153	Jas. Hamilton
164	154	Horizon
165	155	Gismonda
166	156	
167	157	
168	158	Countess Grey
169	159	Cœur de Lion
170	160	
171	161	Châteaubriand
172	162	Claude Gellée
173	163	Bonnetin

1908	1909	
174	164	Ampère
175	165	
176	166	Solon
177	167	F. Neufchâteau
178	168	J. P. Robertson
179	—	
180	169	Paragon
181	170	Miramar
182	171	
183	172	Henri Regnault
184	173	Francillon
185	174	
186	175	Fauvette
187	176	
188	177	Thos. Swanston
189	178	Obergartner Mack
190	179	Mrs. Aberdeen
191	180	Magnet
192	—	Masaccio
193	—	John Anderson
194	181	Geo. Goodall
195	—	F. Morton
196	182	Capt. Burnaby
197	183	B. S. Williams
198	184	B. Comte
199	185	Tom Welsh
200	186	M. Bezanson
201	187	Mme. Doriene
202	188	Lord Kelvin
203	189	F. C. Dotter
204	190	Duhamel
205	191	Danton
206	192	Matador
207	193	Coccinea
208	194	
209	—	Leon Valade
210	195	Laniboire
211	196	Alex. Shearer
212	197	A. Franchet
213	198	Jules Breton
214	199	Hermann Ostertag
215	200	Siebold
216	201	
217	202	Mrs. Burn
218	203	Mrs. A. Browning
219	204	Mounet Sully
220	205	Maximilien
221	206	Lothair
222	207	Lady Miller
223	—	
224	208	Lewis Chater
225	209	G. A. Ströhlein
226	210	Etna
227	211	Coquelicot
228	212	
229	213	
230	214	Startler
231	215	Sir Jas. Douglas
232	216	Obélisque
233	—	
234	217	Model
235	218	Mrs. Callender
236	219	Mons. Linden
237	220	John Fraser
238	221	Gen. Van Heutsz
239	222	Flambeau
240	223	
241	224	Embrasement
242	—	Ary Scheffer
243	225	de Bois
244	226	Stanley
245	227	Sesostris
246	228	
247	229	
248	—	Roger Marx
249	230	Profusion
250	231	
251	232	
252	223	Cyrano
253	—	
254	234	Chas. Sellier
255	235	Camille Desmoulins
256	236	Astéroide
257	237	Acropole
258	238	Theresa
259	239	Sphinx
260	240	
261	241	Sir Dighton Probyn
262	242	Shirley Hibberd
263	243	Roxelane
264	244	
265	245	Pat Robertson
266	246	
267	247	Mrs. Derring
268	248	Mariette
269	249	Le Vengeur
270	250	L'Aiglon
271	251	J. Chamberlain
272	252	John Stewart
273	253	Henri Roujon
274	254	
275	255	Henri Marcel
276	256	Girondin
277	257	
278	258	Dupleix
279	259	Brilliant
280	260	
281	261	Bacchante
282	262	Tourbillon
283	263	
284	264	
285	265	Mrs. McLeod

1908	1909	
286 287	266 267	E. Boissier
288 289	268 269	Eclaireur
290 291	270 271	Croix de Lorraine
292	273	Comète
293	274	Comet
294 295	275 276	Anatole le Braz
296 297	277 278	Professor Nocard
298	279	Mrs. G. Wigan
299 300 301	280 281 282	Montagnard
302	—	Henry Royer
303 304	283 284	Pharaon
305 306	285 286	Léon Guignard
307 308	287 288	Hiéroglyphe
309	289	De Lacepede
310	290	Bouquet
311	291	Aspasie
312 313	292 293	Belvédère
314	294	Ophir
315	295	Mrs. W. P. Wright
316	296	Miss Pemberton
317	297	Florrie Cooper
318	298	Fernand Cortez
319	299	Thébaïde
320 321	300 301	Montrose
322	302	Mentmore
323	303	Le Rex
324	304	Le Donon
325	—	Kossuth
326	305	H. Fouquier
327 328	306 307	Comtesse de Jarnac
329	308	W. E. Gladstone
330	309	Splendens
331 332	310 —	Sheriff Ivory
333	311	Redoute
334	312	Printemps
335	313	Paul Fliche
336	314	Parthenon
337	315	Marinette
338	316	Mr. Gladstone
339	317	Mandoline
340	318	Lumineux
341	319	La Perle
342	320	Jas. Bennett
343	321	John McLeod
344 345	322 323	Gen. Giovaninelli
346	324	G. Planchon
347	325	G. Larroumet
348 349	326 327	Fedora
350	328	Duchess of Roxburghe
351 352	329 330	de Mirbel
353	—	Beatrice
354 355	331 332	Brongniart
356	333	Baccile
357	334	Armand Dayot
358	335	André Michaux
359 360	336 337	Adonis
361 362	— 339	Suffrage
363	340	Robert Pringle
364 365	341 342	Mozart
366 367	343 —	Le Siècle
368	344	Lady Raleigh
369 370	345 346	Wm. Robinson
371	347	Salmonea
372 373	348 349	Roi des Roses
374 375	350 351	Regulus
376 377	353 354	Panthéon
378	355	Opale
379	—	Neil Glas
380 381	356 357	Mrs. Oliver
382 383	358 359	Molière
384	360	Merlin
385	361	Marquis de Breteuil
386	—	Marchioness of Linlithgow
387	362	Liberté
388	—	L'Avenir
389	363	Juliette
390	364	John Jakeman
391	365	George Grieve
392	366	Frau A. Commerell
393	367	Fort de France
394	368	Etienne Lamy
395	369	Aviation
396	370	Archibald Forbes

1908	1909	
397	371	Andrew Browning
398	372	Pêcheur d'Islande
399	373	Mrs. Jas. Farquhar
400	—	
401	—	Isabey
402	374	Doreen
403	375	Atlantide
404	376	Thos. Hay
405	377	Seduction
406	378	Miss Wilson
407	—	Miss Willmott
408	378	Lady Nina Balfour
409	—	Glendaruel
410	—	F. J. Marshall
411	380	Espérance
412	381	
413	382	
414	383	Champollion
415	384	A. Harwood
416	385	Aurora
417	386	P. Bonnetain
418	387	Lady Tate
419	388	John Lamont
420	389	John Forbes
421	390	
422	391	Gruppenkönigin
423	392	
424	393	Gen. Chanzy
425	394	Chas. Pfister
426	395	Muriel Rogers
427	396	Massillon
428	397	The Queen
429	398	Poussin
430	399	
431	400	Mme. Neera
432	401	
433	402	Javanaise
434	403	
435	404	Huxley
436	405	
437	—	Hedwig Stiegler
438	406	Fantaisie
439	407	Auguste Fremiet
440	408	Antonin Mercié
441	409	Rachael
442	410	Prince of Wales
443	411	Pline
444	412	Maspèro
445	413	
446	414	
447	415	Magician
448	416	Lady Tweeddale
449	417	Béranger
450	418	A. J. Ashmore
451	—	Rose Caron
452	419	Prosper Henry
453	—	Prof. Virchow
454	420	Prince d'Arenberg
455	421	Philibert Audebrand
456	422	Mrs. McCallum
457	423	Memphis
458	424	
459	—	Mme. A. Denis
460	425	Longchamps
461	426	Leonardo da Vinci
462	427	Joséphine Gerbaux
463	—	Henri Mürger
464	428	Gen. Bréart
465	429	Faust
466	430	François Chabas
467	—	
468	431	Espoir
469	432	Emile Duclaux
470	433	Delicata
471	434	
472	435	David Syme
473	436	Croix du Sud
474	437	Crépuscule
475	438	
476	439	Countess of Minto
477	440	Christina Stuart
478	441	Cameron
479	442	Bouquet de St. Cyr
480	443	Aglaë Adanson
481	444	
482	445	Golphin
483	446	W. J. Marlow
484	447	Von Lassberg
485	448	Tapis Blanc
486	449	
487	450	Sylphide
488	451	
489	452	Pureté
490	453	Pyramid
491	454	
492	455	Panama
493	—	M. P. Carpentier
494	456	M. Serao
495	457	
496	458	Miss Bouverie
497	459	Mme. M. Carvalho
498	460	
499	—	Mme. Kruger
500	461	Lucy Genin
501	462	Lawrence
502	463	La Neige
503	464	
504	465	Hélène Vacaresco
505	466	
506	467	Fleur de Neige
507	468	Flocon de Neige
508	469	

1908	1909	
509	470	Fiancée
510	471	
511	472	
512	473	Eden
513	474	Diadem
514	475	Diadème
515	476	Berenice
516	—	
517	477	Lady Napier
518	478	Mrs. Forbes
519	479	Snowflake
520	480	Mrs. Brunton
521	—	Chas. J. Moir
522	481	Attraction
523	482	
524	483	Diana
525	484	Gen. Roberts
526	—	Herbert Cutbush
527	485	Luna
528	—	Maggie Forbes
529	486	Miss Lingard
530	487	Mrs. May
531	488	Mrs. Jas. Watt
532	489	Penge
533	—	Perfection
534	490	Rev. Dr. Hornby
535	491	
536	—	Stephen Brooker
537	492	Harry Veitch
538	493	Ladysmith
539	494	Comet
540	495	Forerunner
541	496	Prince
542	497	Robert Glen
543	498	Mrs. Cobham
544	499	Agnes
545	500	Surprise
546	501	Lady Corry
547	502	Mrs. J. Hope
548	503	
549	504	Chameleon
550	505	Fantasy
551	506	Jas. Hunter
552	507	Magnificence
553	508	Mrs. Greig
554	509	The Queen
555	510	John Burn
556	511	Marquess
557	512	Marquess of Huntly
558	513	
559	514	Mrs. Anderson
560	515	
561	516	Mrs. Reid
562	517	Murillo
563	518	R. W. Hodder
564	519	Rosy Gem
565	520	Sunray
566	521	W. Patience
567	522	Sunrise
568	—	Charlie Downie
569	523	Senator
570	524	Thos. Reid
571	525	Excellence
572	526	Magnum Bonum
573	527	Shakespeare
574	528	Agnes Newton
575	529	Burns
576	530	
577	531	Mrs. Miller
578	532	Mrs. J. Robertson
579	533	A. McLeod
580	534	Beauty of Edinburgh
581	535	Bicar
582	536	Clouded Gem
583	537	Col. Flatter
584	538	Eclipse
585	539	Elegans
586	540	Empress
587	541	Foreward
588	542	Garibaldi
589	543	Geo. Macmillan
590	544	Grace Darling
591	545	Highland Mary
592	546	Kemo
593	547	Lady Halliburton
594	548	Lady W. Lawson
595	549	Lennox Beauty
596	550	Linnette
597	551	Miss E. Stevenson
598	552	Miss Nelson
599	553	Miss Robertson
600	554	Miss Ure
601	555	Mrs. Cook
602	556	Mrs. Craven
603	557	Mrs. Downie
604	558	Mrs. Elder
605	559	Mrs. G. Watson
606	560	Mrs. J. Ross
607	561	Mrs. Leckie
608	562	Mrs. McArthur
609	563	Mrs. Mackie
610	564	Mrs. McLellan
611	565	Mrs. Ritchie
612	566	Mrs. Stewart
613	567	Mrs. Trail
614	568	Pearl
615	569	Progress
616	570	Purple Gem
617	571	Rob. Patrick
618	572	Rose of Castile
619	573	Star of the West
620	574	Syren

1908	1909	
621	575	T. Grainger
622	576	Twilight
623	577	Wm. Kirkpatrick
624	578	(unnamed)
625	—	Alhambra
626	579	Cigale
627	580	Croesus
628	—	Croix du Sud
629	581	Esmé
630	582	Lady Satanella
631	583	Mme. J. Pfeiffer
632	584	Mrs. Jenkyns
633	585	Ormonde
634	586	Reichsgraf von Hochberg
635	587	Splendens
636	588	Stanislas
637	589	Sir Fred. Leighton
638	590	Too Too The Pink
639	—	Tempête
640	591	W. Muir
641	592	Amiral Jaurès
642	593	Antonin Mercié
643	594	Crépuscule
644	595	Daniel Lesueur
645	596	Esclairmonde
646	597	Etoile
647	598	Eugène Danzanvilliers
648	599	Fantôme
649	—	Geoffrey St. Hilaire
650	600	Iris
651	601	Javanaise
652	602	Maupertuis
653	603	M. Duponchel
654	604	Orientale
655	605	Panorama
656	606	Paul Bert
657	607	Pharaon
658	608	Richepin
659	609	Salvator Rosa
660	610	Spirite
661	611	Amarante
662	612	Cœur de Lion
663	613	Edmond Audran
664	614	Edmond Rostand
665	—	Francillon
666	615	Inaudi
667	616	Lady Grey
668	—	Le Mahdi
669	617	Lord Rayleigh
670	618	Louis Blanc
671	619	Mariette
672	620	Multiflore
673	621	Robur
674	—	Talma
675	622	W. Ramsay
676	623	Aquilon
677	624	Coccinea
678	625	Croix de Lorraine
679	626	Fernand Cortez
680	627	Gen. Giovaninelli
681	—	Gustave Larroumet
682	628	Lady Diana
683	—	Lord Kelvin
684	—	Opera
685	629	Prof. Nocard
686	630	Roxelane
687	631	Schliemann
688	632	Tom Welsh
689	633	Adonis
690	634	Coquelicot
691	635	De Bois
692	636	Embrasement
693	637	Etna
694	638	Feu de Bengal
695	629	Flambeau
696	640	G. A. Ströhlein
697	641	Gen. van Heutsz
698	542	Henri Regnault
699	643	Ideal
700	—	Jocelyn
701	544	Jungfrau
702	645	L'Aiglon
703	646	Laniboire
704	647	Météore
705	648	Molière
706	649	Mounet Sully
707	650	Mrs. Oliver
708	—	Obélisque
709	—	Panthéon
710	651	Regulus
711	652	Siebold
712	—	Solon
713	653	Stendhal
714	654	Toreador
715	655	W. Robinson
716	656	Champollion
717	657	De Mirabel
718	658	Gomez
719	—	Grévin
720	659	Gruppenkönigin
721	660	Jourdan
722	661	Jules Cambon
723	662	Lady de Ramsay
724	663	Lady Hermione
725	664	Lady Molly
726	—	Le Soleil
727	—	Mme. A. Denis
728	665	Marquis de Breteuil
729	666	Martinique
730	667	Maspèro

1908	1909		1908	1909	
731	668	Massenet	741	675	Gen. Bréart
732	669	Mrs. Standing	742	676	Hélène Vacaresco
733	670	Parthenon	743	677	Henri Mürger
734	671	Paul Martin	744	678	Lady Grizel
735	672	Pink Perfection	745	679	Mme. M. Carvalho
736	—	Prof. Virchow	746	680	Memphis
737	673	Selma	747	681	Prosper Henry
738	—	Sheriff Ivory	748	682	Rheingau
739	—	Sphinx	749	683	Snow Queen
740	674	Freifräulein von Lassberg	750	684	Sylphide
			751	685	Tapis Blanc

PHLOX SUFFRUTICOSA VARIETIES.

Flowering in July and August.

Agnes (Forbes).—Rose, with deep reddish magenta eye, the eye colour diffusing somewhat; good, much-branched pyramidal truss. $1\frac{1}{2}$ foot.

Agnes Newton (Forbes).—White, faintly tinged with mauve, with a deeper eye; flower $1\frac{3}{8}$ inch; dense oblong truss. 2 feet.

A. McLeod (Dobbie).—Reddish violet, with small distinct deeper eye; flower $1\frac{3}{8}$ inch; weak pyramidal truss. $2\frac{1}{2}$ feet.

Attraction (Forbes).—White, with well-defined purplish magenta eye; flower 1 inch, flat, of good form; dense oblong truss. $2\frac{1}{2}$ feet.

Attraction (Dobbie).—Deep mauve, shading to white at edge; flower $1\frac{1}{2}$ inch; fine pyramidal truss. $1\frac{3}{4}$ foot.

Beauty of Edinburgh (Dobbie).—Magenta, shading to white at edge; flower $1\frac{1}{4}$ inch; large pyramidal truss, very vigorous. $2\frac{1}{2}$ feet. The showiest variety in late July.

Bicar (Dobbie).—Reddish-violet, a little deeper at the eye; flower $1\frac{1}{8}$ inch; large branching truss. 2 feet.

Burns (Forbes).—Reddish-violet with a deeper eye; flower 1 inch; pyramidal truss. $1\frac{1}{2}$ foot.

Burns (Dobbie).—White, with mauve eye, the eye colour diffusing slightly; flower $1\frac{1}{4}$ inch, flat; oblong truss. 2 feet.

Chameleon (Forbes).—Pale purplish-mauve with deeper eye; flower $1\frac{1}{4}$ inch; pyramidal truss. 2 feet.

Charlie Downie (Forbes).—Failed.

Chas. J. Moir (Forbes).—Failed.

Clouded Gem (Dobbie).—Pale lilac-mauve, whitish at edges of the petals, with a slightly diffusing magenta eye; flower $1\frac{1}{4}$ inch, flat; dense oblong truss. $2\frac{1}{2}$ feet.

Col. Flatter (Dobbie).—Reddish-violet, with a slightly darker eye; flower $1\frac{1}{4}$ inch, flat, circular; bold oblong truss. 2 feet.

Comet (Forbes).—White, tinged lilac, with pure white eye, and narrow white edge to petals; flower $1\frac{1}{4}$ inch, flat; medium truss. $1\frac{1}{2}$ foot.

Diana (Forbes).—White, with distinct magenta eye; flower $1\frac{1}{4}$ inch; corolla tube magenta; poor weak pyramidal truss. 1 foot.

Eclipse (Dobbie).—Pale mauve, with magenta eye; flower $\frac{3}{4}$ inch; very loose truss. 2 feet.

Elegans (Dobbie).—Similar to Eclipse, but slightly deeper in colour.

Empress (Dobbie).—White, slightly tinged with rose, with a distinct deep magenta eye; flower $1\frac{3}{8}$ inch, flat. $1\frac{1}{2}$ foot.

Excellence (Forbes).—White, tinged with rose, with a deep magenta eye which diffuses somewhat; flowers large, round; a good dense truss. $1\frac{1}{2}$ foot.

Fantasy (Forbes).—Mauve, with a paler centre; flower $1\frac{1}{4}$ inch; very weak truss. $1\frac{1}{2}$ foot.

Forerunner (Dobbie).—Mauve, with a small deeper eye; flower $1\frac{1}{4}$ inch; oblong truss. $1\frac{1}{2}$ foot. Similar, but inferior, to Mrs. Greig.

Foreward (Dobbie).—Pure mauve, slightly darker round eye; flower $1\frac{3}{4}$ inch, of good form; large oblong truss. 2 feet.

Garibaldi (Dobbie).—Pure white, with distinct magenta eye; flower $1\frac{3}{8}$ inch; good truss, vigorous. 2 feet.

Gen. Roberts (Forbes).—Very pale mauve, with deep mauve eye; flower $1\frac{3}{8}$ inch; ragged; large, loose pyramidal truss. $2\frac{1}{2}$ feet.

Geo. Macmillan (Dobbie).—Mauve with darker eye; flowers large; dense truss. 2 feet.

Grace Darling (Dobbie).—White, tinged with pale rose, with a magenta eye; flower $1\frac{1}{4}$ inch. A showy variety. 2 feet.

Harry Veitch (Forbes).—White, with a deep magenta eye, which diffuses somewhat; flower $1\frac{1}{4}$ inch, flat; large dense oblong truss. A very free and vigorous variety. 2 feet.

Herbert Cutbush (Forbes).—Failed.

Highland Mary (Dobbie).—Same as Agnes Newton.

James Hunter (Forbes).—Reddish-violet self; flower $1\frac{1}{8}$ inch; dense broad pyramidal truss. 2 feet.

John Burn (Forbes).—Pale reddish-violet, somewhat deeper round the eye; flower $1\frac{1}{2}$ inch; truss loose. 2 feet.

Kemo (Dobbie).—White, with narrow magenta band round eye; flower $1\frac{1}{4}$ inch, of poor form; large dense oblong truss. $2\frac{1}{2}$ feet.

Lady Corry (Forbes).—Pale reddish-violet; flower $1\frac{1}{4}$ inch, flat; dense oblong truss. $2\frac{1}{2}$ feet.

Lady Halliburton (Dobbie).—Pure white; flower $\frac{3}{4}$ inch, thin oblong truss, weak. 2 feet.

Lady Napier (Forbes).—White, with a faint narrow purplish band round the eye; flower $1\frac{1}{2}$ inch, flat, round; good, branching, full-flowered truss. $2\frac{1}{2}$ feet.

Ladysmith (Forbes).—White, with a slightly diffusing magenta eye; flower $1\frac{3}{8}$ inch; good dense pyramidal truss. $1\frac{1}{2}$ foot.

Lady W. Lawson (Dobbie).—Mauve, with a distinct deeper eye; flower $1\frac{3}{8}$ inch, well formed; vigorous. 2 feet. Similar to Geo. Macmillan, but eye not quite so deep.

Lennox Beauty (Dobbie).—White, with an irregular mauve eye; flower $1\frac{1}{4}$ inch; good vigorous variety. $2\frac{1}{2}$ feet.

Linnette (Dobbie).—Pale mauve, with a darker eye, almost white at edge; flower $1\frac{1}{8}$ inch; weak truss. $1\frac{1}{2}$ foot.

Luna (Forbes).—White, with magenta eye; flowers well formed; good pyramidal truss. $1\frac{1}{2}$ foot.

Maggie Forbes (Forbes).—Very similar to Luna, but the eye diffuses somewhat; flower $1\frac{3}{8}$ inch. $1\frac{1}{2}$ foot.

Magnificence (Forbes).—Rosy-magenta, with a deeper eye; flower $1\frac{1}{2}$ inch; dense truss. $1\frac{1}{2}$ foot.

Magnum Bonum (Forbes).—Reddish-violet, with a deeper eye; flowers large, waved; good truss. $1\frac{1}{2}$ foot.

Marquess (Forbes).—Same colour as Murillo, but not nearly so vigorous. $1\frac{1}{2}$ foot.

Marquess of Huntly (Forbes, Dobbie).—White, with very faint tinge of magenta round the eye; flower $1\frac{1}{4}$ inch, flat; oblong truss. $1\frac{1}{2}$ foot.

Miss E. Stevenson (Dobbie).—White, with a pale magenta eye; medium truss. 2 feet.

Miss Lingard (Forbes), **XXX** July 29, 1909.—White, with a faint tinge of rosy-magenta round the eye; flower $1\frac{1}{4}$ inch, of good form, and substance; very fine pyramidal truss. 3 feet. This was the best variety out on July 10, and was still good on July 29.

Miss Nelson (Dobbie).—White, tinged with mauve, with a mauve eye; flower $1\frac{3}{8}$ inch; oblong truss. $1\frac{1}{2}$ foot.

Miss Robertson (Dobbie).—Same as Miss Nelson, but flowers slightly larger.

Miss Ure (Dobbie).—Mauve, with slightly deeper eye; flower $1\frac{1}{2}$ inch; truss much branched, pyramidal. 2 feet.

Mrs. Anderson (Forbes, Dobbie).—Mauve, with deeper eye; flower $1\frac{1}{4}$ inch; dense pyramidal much-branched truss. 2 feet. This variety burns badly.

Mrs. Brunton (Forbes).—White, shaded magenta, with magenta eye; flower $1\frac{1}{4}$ inch; long dense oblong truss. 2 feet.

Mrs. Cobham (Forbes).—White, tinged with rose, with reddish-violet eye; flower 1 inch; truss oblong, rather loose. $1\frac{1}{2}$ foot.

Mrs. Cook (Dobbie).—White, with magenta eye, which diffuses somewhat; flower $1\frac{3}{4}$ inch; spreading, much-branched truss. $1\frac{1}{2}$ foot.

Mrs. Craven (Dobbie).—White, with pale violet eye; flower $1\frac{3}{8}$ inch; dense truss. Weak.

Mrs. Downie (Dobbie).—White, with magenta eye; flower $1\frac{1}{4}$ inch; medium truss. 2 feet.

Mrs. Elder (Dobbie).—White, tinged and flaked mauve, slightly deeper round the eye; flowers small; dense oblong truss. $2\frac{1}{2}$ feet. A very showy variety.

Mrs. Forbes (Forbes).—Failed.

Mrs. Greig (Forbes).—Mauve, with a few darker marks round the eye, and slightly lighter towards the edge; flower $1\frac{3}{8}$ inch, flat; very bold truss, branching from the base. 3 feet. One of the showiest of the section.

Mrs. G. Watson (Dobbie).—White, with magenta eye; flower 1 inch very weak. 1 foot.

Mrs. J. Hope (Forbes, Dobbie).—White, faintly tinged rose, with magenta eye, which diffuses; oblong truss. 2 feet.

Mrs. Jas. Robertson (Forbes).—Reddish-violet with deeper eye; flower $1\frac{1}{4}$ inch; dense pyramidal truss. 2 feet. One of the best of its colour.

Mrs. J. Ross (Dobbie).—White, with a deep magenta eye; flower $1\frac{3}{8}$ inch; rather weak truss. 2 feet.

Mrs. Leckie (Dobbie).—White, with a distinct magenta eye; flower 1½ inch; medium truss, vigorous. 2 feet. One of the best of this colour.

Mrs. McArthur (Dobbie).—Same as Lady W. Lawson.

Mrs. Mackie (Dobbie).—Mauve, with a slightly deeper eye; flower 1¼ inch; petals many, crowded; loose oblong truss. 2 feet.

Mrs. McLellan (Dobbie).—White, with a diffusing magenta eye; flower 1 inch; small, loose truss, weak. 1 foot.

Mrs. May (Forbes).—White, tinged with pale rosy-lilac, with pale reddish-violet eye; poor, weak truss.

Mrs. Miller (Forbes).—Reddish-violet with much darker eye; flower 1¼ inch; well-branched oblong truss. 2 feet. Very showy.

Mrs. Reid (Forbes).—Reddish-violet self; flowers large, round, flat; short, dense, broad truss. 2 feet. A good flower, but burns badly.

Mrs. Ritchie (Dobbie).—Pure white, with a well-defined magenta eye; flower 1¼ inch; poor truss. 1½ foot.

Mrs. Stewart (Dobbie).—White, with a slightly diffusing mauve eye; flower 1¼ inch; oblong truss. 2½ feet. Another plant under the same name had a more distinct eye.

Mrs. Trail (Dobbie).—Green, flaked crimson, quickly fading in the sun; flower 1 inch, much crisped; small truss. 1½ foot. Curious, but useless in the border.

Mrs. Watt (Forbes).—White, with diffusing magenta eye; oblong truss. 1¼ foot. Very much like Harry Veitch, but inferior to that variety.

Murillo (Dobbie).—Pale reddish-violet, with a deeper eye; flower 1½ inch; vigorous. 2 feet.

Pearl (Dobbie).—White, tinged with pale magenta round eye; flower 1½ inch, of good form; pyramidal truss. 2 feet.

Penge (Forbes).—Clear white, with very distinct magenta eye; flower 1¼ inch, flat, of good form; small truss. 1½ foot. A very pretty variety, but weak.

Perfection (Forbes).—Failed.

Prince (Forbes).—White, with a mauve eye diffusing to edge; flower 1¼ inch; dense oblong truss. 2½ feet.

Progress (Dobbie).—Same as Pearl.

Purple Gem (Dobbie).—Creamy white, suffused with very pale mauve, a little darker at the eye; 2 feet. Possibly wrongly named.

Rev. Dr. Hornby (Forbes, Dobbie).—White, with a deep magenta eye, shading to pale bluish-purple; truss oblong, poor; plant weak. 2 feet.

Robt. Glen (Forbes).—Magenta white, with magenta eye, which runs very much; flower 1⅜ inch, good truss. 1¾ foot.

Robt. Patrick (Dobbie).—A little darker than Mrs. Elder, but goes pure white when exposed to sun—white, flaked mauve, fading to white. 2½ feet.

Rose of Castile (Dobbie).—Pure white, with a faint trace of magenta round the eye; very near Purple Gem, but weaker.

Rosy Gem (Forbes).—Rosy-magenta, with a deeper eye; flower 1¼ inch; truss broad, much-branched. 2 feet.

R. W. Hodder (Forbes).—Mauve, almost self, but slightly deeper at the eye; flower 1¼ inch; good long truss. 1½ foot.

Senator (Forbes).—Pure white, with trace of cream in eye; flower $1\frac{3}{8}$ inch, petals recurved; truss thin. 2 feet.

Shakespeare (Forbes).—Mauve, slightly deeper at the eye, but practically self; flower $1\frac{1}{4}$ inch, poor; good truss. 2 feet.

Snowflake (Forbes).—White, a few flowers showing a very faint lilac eye; flower $1\frac{1}{4}$ inch; dense, much-branched truss. $1\frac{1}{2}$ foot. The best white on July 16.

Star of the West (Dobbie).—Pure white; weak oblong truss. 2 feet.

Stephen Brooker (Forbes).—Failed.

Sunray (Forbes).—Pale reddish-violet, a little deeper at the eye; flower $1\frac{1}{4}$ inch, flat; good bold truss. 2 feet.

Sunrise (Forbes).—Reddish-violet, slightly deeper at the eye; flower 1 inch; bold pyramidal branching truss. $2\frac{1}{2}$ feet. Flowers small, but very freely produced.

Surprise (Forbes).—White, tinged pale reddish-violet, with a well defined eye of the same colour; flower $1\frac{1}{4}$ inch, flat; good oblong truss. $1\frac{1}{2}$ foot.

Syren (Dobbie).—White, tinged and flaked mauve, slightly deeper round the eye; flowers small; dense truss. $2\frac{1}{2}$ feet.

T. Grainger (Dobbie).—White, faintly suffused mauve; flower $1\frac{3}{8}$ inch; broad, branching truss. 2 feet.

The Queen (Forbes).—Mauve, tinged with deep mauve, with a deep rosy-carmine eye; flower 1 inch, flat; bold truss. 3 feet.

Thos. Reid (Forbes).—Failed.

Twilight (Dobbie).—Pale Bishop's violet, becoming bluish-violet; flower $1\frac{3}{8}$ inch; fair truss. $1\frac{3}{4}$ foot.

W. Kirkpatrick (Dobbie).—Mauve, with a deeper eye; flower $1\frac{3}{4}$ inch; bold truss. $2\frac{1}{2}$ feet.

W. Patience (Forbes).—Mauve, with a well-defined carmine eye; flowers small, but of good form; truss weak, pyramidal. 2 feet.

Phlox paniculata decussata (P.) Varieties.

Acropole (Chiswick).—Mauve, with white centre; flower $1\frac{1}{2}$ inch; poor truss. $1\frac{1}{2}$ foot.

Adonis (Chiswick, Dobbie, Barr).—Salmon-rose with rose eye, and a paler region round the eye; flower $1\frac{1}{2}$ inch, flat; good dense pyramidal truss. 3 feet.

A. Franchet (Forbes).—Carmine, shading deeper towards eye; flower $1\frac{1}{2}$ inch, flat, round; bold much-branched truss. Vigorous. 2 feet.

Aglaë Adanson (Dobbie).—Pale bluish-lilac, with large reddish-violet centre; flower 1 inch; weak truss. 3 feet.

Aglae Adanson (Forbes).—White, with faint magenta markings round eye; flower $1\frac{3}{4}$ inch; dense pyramidal truss. $1\frac{1}{2}$ foot. This is quite distinct from the foregoing.

A. Harwood (Forbes).—Rosy-magenta, streaked with white, with a deeper eye; flowers large; truss weak. $1\frac{1}{2}$ foot.

A. J. Ashmore (Forbes).—White, tinged with pale rosy-lilac; flower $1\frac{1}{2}$ inch, of poor form; dense pyramidal truss. 2 feet. A very pretty variety.

Alex Shearer (Chiswick).—Failed.

Alhambra (Barr).—Failed.

Amarante (Barr).—Crimson-carmine; flower 1½ inch, with curled petals; truss poor. 2 feet.

Amiral Jaurès (Barr, Dobbie, Forbes).—Bluish-lilac, the colour unevenly distributed; flower 1 inch; broad, much-branched truss. 1½ foot.

Amos Perry (Perry).—Deep rosy-pink, with a deeper eye, and a pale band round the eye; flower 1½ inch; oblong truss. 2 feet.

Ampère (Dobbie, Forbes).—Pale bluish-lilac, with purple eye; flowers large; dense truss. 2½ feet.

Amphitryon (Dobbie).—Bluish-lilac, tinged with purple, and paler near the eye; flower 1 inch, wavy; truss weak. 2½ feet.

Anatole le Braz (Dobbie, Forbes).—Rosy-carmine, with a whitish band round the eye: flower 1¾ inch, of good form; dense pyramidal truss. 2½ feet.

André Michaux (Dobbie), **XXX** August 14, 1908.—Pale rose, with magenta eye; flower 1¾ inch; broad, flat truss. 2½ feet.

Andrew Browning (Forbes).— Did not flower.

Antonin Mercié (Barr, Chiswick).—Bluish-lilac, with a large white eye; flower 1¾ inch, flat; dense much-branched pyramidal truss. 2½ feet.

Antonio Fogazzaro (Dobbie).—Rosy-pink, with a white band surrounding the eye; flower 1¾ inch. 2 feet.

Aquilon (Barr).—Rosy-carmine; much-branched, loose truss. 2½ feet.

Archibald Forbes (Chiswick).—Rosy-magenta, slightly deeper at the eye; flower 2 inches, of good form; weak truss. 1½ foot.

Argon (Dobbie).—Pale pink, with a darker eye; flower 1⅞ inch, of good form; good showy truss. 2 feet.

Armand Dayot (Forbes).—Salmon, with a magenta eye, and a paler band round it; flower 1¾ inch; broad truss. 1½ foot.

Artaxis (Chiswick, Forbes).—Mauve, with a white eye; weak truss. 1½ foot.

Ary Scheffer (Forbes).—Failed.

Aspasie (Chiswick), **XX** August 2, 1892.—Rosy-magenta, with white eye; flower 1¼ inch; large, dense truss. 1½ foot. The calyces are bronze, forming a good background to the flowers.

Astéroide (Chiswick).—Purplish, paler round the eye; flower 1¼ inch, poor; weak truss. 2 feet.

Atlantide (Chiswick).—Rosy-pink, with a white eye; flower 1½ inch; good, much-branched truss. 1½ foot.

Auguste Fremiet (Forbes).—Salmon-rose, with a deeper eye; flower 1¾ inch, of good form; oblong truss. 2½ feet.

Auguste Raffet (Forbes).—Reddish-violet, with pale lilac centre; flower 2 inches; dense flat truss. 2 feet. A showy variety.

Auricula Eye (Perry).—Rosy-purple, with a white eye; flower 1 inch, of poor form, but showy; broad much-branched truss. 3 feet.

Aurora (Dobbie).—White, tinged lilac, with magenta eye; corolla tube heavily tinged lilac; flower 1¾ inch; loose truss. 2 feet.

Aviation (Forbes).—Salmon-rose; flower 1¾ inch, of good form; broad, dense, pyramidal truss. 2 feet. A very showy variety.

Bacchante (Chiswick).—Carmine, with a deeper eye; flower $1\frac{1}{4}$ inch, with reflexed petals; poor, weak truss. $1\frac{1}{2}$ foot.

Baccile (Dobbie).—Reddish violet, with a deeper eye; flower $1\frac{5}{8}$ inch, of good form; dense pyramidal truss. $1\frac{3}{4}$ foot. One of the best of its colour.

Balzac (Chiswick).—Failed.

Barblanegre (Chiswick).—Failed.

B. Compte (Dobbie).—Rich crimson-carmine, slightly deeper at the eye; flower 1 inch; weak truss. 2 feet.

Beatrice (Chiswick), **A.M.** July 27, 1897.—Failed.

Belvédère (Chiswick, Dobbie), **XX** August 16, 1892.—Rosy-carmine, with a deeper eye; flower $1\frac{1}{4}$ inch; large dense truss. $1\frac{1}{2}$ foot.

Béranger (Forbes), **A.M.** July 27, 1897.—Pale salmon-rose on opening, which changes to rose, slightly deeper at the eye; flower $1\frac{3}{4}$ inch; broad dense truss. 2 feet.

Berenice (Chiswick, Forbes).—Pure white; flower $1\frac{3}{8}$ inch, flat; dense, medium truss. $1\frac{1}{2}$ foot.

Bonnetin (Chiswick).—Rosy-pink, with white eye; flower $1\frac{1}{2}$ inch; weak truss. $2\frac{1}{2}$ feet.

Boule de Feu (Chiswick), **XXX** August 16, 1892.—Dark carmine-scarlet, with a deeper eye; flower 1 inch; poor truss. $1\frac{1}{2}$ foot.

Bouquet (Chiswick).—Failed.

Bouquet de St. Cyr (Chiswick), **A.M.** July 27, 1897.—White, with a rosy-crimson eye; flowers large; truss large. $1\frac{1}{2}$ foot.

Brilliant (Chiswick).—Carmine, with rose eye; flower $1\frac{3}{4}$ inch; weak truss. $1\frac{1}{2}$ foot.

Brilliant (Dobbie).—Rich carmine-crimson; flower $1\frac{1}{8}$ inch, flat; good, broad, much-branched truss. 3 feet.

Brongniart (Dobbie).—Pale rose, tinged with deep rose, with magenta eye; flower $1\frac{3}{4}$ inch; broad, vigorous truss. $1\frac{3}{4}$ foot.

Brongniart (Forbes).—Quite distinct from the above. Rich rosy-carmine, with a slightly deeper eye; flower $1\frac{1}{4}$ inch; loose, much-branched truss. $2\frac{1}{2}$ feet.

B. S. Williams (Forbes).—Carmine-lake, with a deeper eye; flower 1 inch; much-branched truss. $2\frac{1}{2}$ feet. A showy variety.

Cameron (Forbes).—White, tinged rose, with pale rosy-magenta eye; flower $1\frac{3}{4}$ inch; loose truss. $3\frac{1}{2}$ feet.

Camille Desmoulins (Forbes).—Failed.

Capt. Burnaby (Dobbie).—Fiery-red, with magenta eye; flower 1 inch; much-branched truss. $2\frac{1}{2}$ feet.

Carminea (Perry).—Rosy-pink, with a darker eye; broad, much-branched truss. $2\frac{1}{2}$ feet. Very showy.

Champignol (Chiswick).—Failed.

Champollion (Chiswick, Barr).—Carmine-purple, with magenta eye, and a paler zone round the eye; flower $1\frac{3}{4}$ inch; dense pyramidal truss. 3 feet.

Chanzy (Dobbie), **F.C.C.** 1872.—Magenta, with a deeper eye; flower $1\frac{1}{4}$ inch; large, loose truss. 2 feet.

Chas. Flahault (Dobbie, Forbes).—White, with well-defined regions of violet on the petals; buds blue; large, well-formed flowers; good, bold truss. $2\frac{1}{2}$ feet.

Chas. Pfister (Forbes).—Carmine-purple, with white centre; flower 1¾ inch, petals reflexed; dense truss. 1¾ foot.

Chas. Sellier (Forbes).—Reddish-violet, with distinct white centre; flower 1¾ inch, of good form; broad pyramidal truss. 2½ feet. The best of its colour.

Châteaubriand (Chiswick).—Failed.

Cherubim (Dobbie).—Purplish-lilac, with white stripes; flower 1 inch, poor form; bold truss. 2 feet.

Chopin (Dobbie).—White, with rose eye; flower 1 inch, of very good form; broad much-branched truss. 2 feet.

Christina Stuart (Dobbie).—White, with magenta eye; flower 1 inch; weak truss. 3½ feet.

Cigale (Barr).—White, faintly tinged rose, with a rosy-magenta eye; flower 2 inches; dense, short, pyramidal truss. 2 feet.

Claude Gellée (Forbes).—Deep bluish-lilac, with large purple eye; flower 1¼ inch; weak, loose, much-branched truss. 3 feet.

Coccinea (Barr, Chiswick, Forbes), **F.C.C.** 1876.—Bright fiery-red; flower ¾ inch; loose truss. 4 feet.

Cœur de Lion (Chiswick, Dobbie).—Pale reddish-violet, with a deeper eye; flower 1¾ inch, of good form; large, bold truss. 3½ feet. A very showy late variety.

Cœur de Lion (Barr).—White, with a tinge of lilac in tube; flower 1¼ inch; dense, flat truss. 2½ feet.

Colibri (Chiswick).—Failed.

Colonie (Dobbie).—Dark magenta; flower 1½ inch; truss well branched from the base. 1½ foot.

Comedia (Dobbie, Forbes).—Bluish-lilac streaked with purple, with a paler band round the eye; flower 1¼ inch; good, well-branched truss. 3½ feet. A showy, vigorous variety.

Comète (Dobbie).—Mauve, tinged with reddish-violet; flower 1½ inch, of poor form; broad, flat truss. 1½ foot.

Comet (Forbes).—Failed.

Comtesse de Jarnac (Dobbie, Forbes), **XXX** September 4, 1908.—White, tinged with magenta, with magenta eye; the flowers are inconspicuous, but the value of the plant lies in its foliage, which is deeply edged with creamy-white. 2½ feet.

Coquelicot (Barr, Chiswick, Dobbie, Forbes), **A.M** July 27, 1897.—Bright fiery-red, with a rose eye; flower 1½ inch; small, dense, pyramidal truss. 2 feet. A good variety, but superseded by some of the newer ones of its colour.

Cornelia (Chiswick).—Pale bluish-lilac, with white markings; good pyramidal truss. 3 feet.

Corneville (Chiswick, Dobbie).—Deep purple; dense, pyramidal truss. This variety burns badly.

Countess Grey (Chiswick).—Rosy-magenta, with a large white eye, and a streak of magenta in the centre of each petal; flower 1½ inch; medium truss. 2 feet.

Countess of Mar (Chiswick), **XXX** August 16, 1892.—Failed.

Countess of Minto (Forbes).—White, suffused with rosy-lilac, with a Tyrian rose eye; flower 1 inch; dense truss. 3 feet.

Crépuscule (Barr, Chiswick, Forbes).—Bluish-lilac, with a reddish-violet eye; flowers of poor form; pyramidal truss. 2 feet.

Croesus (Barr), **XXX** July 29, 1909.—Strawberry-red, with a deeper eye; large showy truss. 3 feet.

Croix de Lorraine (Barr).—Carmine-purple, with large rose-white centre; flower 1½ inch; broad, dense, flat truss. 3 feet.

Croix de Malte (Dobbie). — Rosy-pink, with white centre; flower 1½ inch; dense, pyramidal truss. 2 feet.

Croix de Malte (Forbes).—White, tinged with bluish-lilac, buds purple; vigorous, much-branched truss. 2 feet.

Croix du Sud (Chiswick), **XXX** August 16, 1892.—White, with magenta eye; flower 1¾ inch; loose, much-branched truss. 1½ foot.

Cyrano (Forbes). Reddish-violet, with a paler centre; flower 1½ inch; small, dense truss. 2 feet. Inferior to Auguste Raffet.

Daniel Lesueur (Barr, Chiswick, Forbes). White, tinged with bluish-lilac, and blue on the reverse of the petals; flower 1¾ inch; petals reflexed; broad pyramidal truss. 2½ feet.

Danton (Forbes).—Rosy-scarlet tinged with salmon, with magenta eye; flower 1½ inch, flat; dense flat truss. 2 feet. Well-formed flowers, but burns badly.

David Syme (Dobbie).—White, faintly tinged rose, with magenta eye; flower 1¼ inch; large truss. 3½ feet. A showy variety.

De Bois (Barr, Chiswick).—Bright rosy-red, becoming paler towards the eye; flower 1¾ inch, starry; good truss, well-branched from base.

De Dombasle (Chiswick).—Purple-lilac, shading to white near the eye; flower 1¼ inch; poor truss. 1½ foot.

Delarey (Dobbie).—Deep magenta; poor flowers. 2 feet.

De Lacepede (Forbes). Rosy-magenta, slightly deeper at the eye; flower 1½ inch; broad, loose truss. 2 feet. Inferior to Eclaireur.

Delicata (Dobbie), **XXX** August 16, 1892.—White, with a faint tinge of magenta at the eye; flower 1½ inch; loose, flat, much-branched truss. 3 feet.

Delicata (Forbes).—Rosy-magenta; flower 1½ inch, loose truss. 2½ feet.

De Mirbel (Barr, Dobbie, Forbes).—Pale rosy-pink, tinged fiery-red, with magenta eye, flower 1½ inch; dense pyramidal truss. 2 feet.

Deuil de St. Pierre (Dobbie, Forbes).—Rich crimson-carmine, with a deeper eye; flower 1¼ inch; loose pyramidal truss. Inferior to Sesostris.

De Wet (Dobbie).—Deep magenta, with a darker eye; flowers waved; loose truss. 2 feet.

Derviche (Chiswick, Dobbie, Forbes).—Deep bluish-lilac, with magenta eye, and a paler band round the eye; flower 1¾ inch, of good form, large, much-branched pyramidal truss. 3 feet.

Diadem (Dobbie).—Failed.

Dr. Charcot (Dobbie, Forbes). Deep bluish-lilac, with a magenta eye, and a paler zone round it; flower 1¾ inch; broad truss. 2 feet.

Dr. Schleicher (Forbes).—Bright rosy-carmine, with white centre; flower 1½ inch, of good form; very bold truss. 3 feet. A very showy variety.

Duhamel (Forbes).—Rosy-salmon, with magenta eye ; flower 1½ inch, of poor form ; weak truss.

Dupleix (Forbes).—White, tinged with lilac, with rosy-magenta eye : flower 1½ inch ; broad well-branched truss. 2 feet.

Duchess of Roxburghe (Forbes).—Mauve, tinged with magenta near the eye ; flower 1¾ inch ; dense pyramidal truss. 3½ feet. A showy variety.

E. Boissier (Dobbie, Forbes).—Reddish-violet, with a white centre ; flower 1½ inch, of poor form ; truss weak. 1½ foot.

Eclaireur (Chiswick, Dobbie), **A.M.** Aug. 23, 1892.—Rosy-magenta, with an indistinct paler band surrounding the eye ; flower 1⅞ inch, round and full ; truss broadly pyramidal. 2½ feet. A very fine vigorous variety, and one of the earliest of the section, flowering from early July till mid-September.

Eden (Chiswick).—Failed.

Edith (Aldersey).—Deep rosy-pink, tinged with lilac, with a deeper eye ; flower 1¾ inch, of good form ; large, much-branched truss. 3 feet.

Edmond Audran (Barr, Dobbie, Forbes).—Bluish-lilac, with purple markings, more especially round the eye ; flower 1½ inch, not of good form ; dense pyramidal truss. 3 feet. Very showy.

Edmond Rostand (Chiswick, Forbes).—Bluish-lilac, with a white centre ; flower 1¼ inch ; erect-branched truss. 2 feet.

Edouard Lockroy (Dobbie, Forbes).—Deep reddish-violet round the eye ; shading to bluish-lilac at the edge ; petals curled ; flower burns ; branched pyramidal truss. 2 feet.

Elaine (Aldersey).—Plant and flower same as Edith, but earlier to flower.

Eleanor (Aldersey).—Rosy-pink, tinged with salmon, with a deeper eye ; flower 1⅛ inch, of good form ; large, much-branched truss. 3 feet.

Elizabeth (Aldersey).—Rosy-pink with a white eye ; flower 1¾ inch, of good form ; much branched loose truss. 3 feet.

Embrasement (Chiswick, Barr).—Carmine-lake, with a deeper eye ; flower 1½ inch, of good form ; weak truss. 1½ foot.

Emile Duclaux (Forbes).—White, faintly tinged lilac, with a magenta eye ; flower 1¾ inch ; good, broad, vigorous truss. 2½ feet. Good.

Emile Krantz (Forbes).—Failed.

Emanuel de Rouge (Dobbie).—Deep-reddish violet, with tinges of purple, and with a darker eye ; flower 1½ inch ; good truss. 2½ feet.

Emmanuel Here (Chiswick, Forbes).—Rose, with a magenta eye ; flower 1¾ inch ; weak truss. 2¾ feet.

Enid (Aldersey).—Light magenta-crimson self ; flower 2 inches, somewhat starry ; weak truss. 3 feet. Showy.

Epopée (Dobbie) **XXX** July 28, 1892.—Magenta, shading paler towards the eye ; flower 1½ inch ; broad, branching truss. 1½ foot.

Erebus (Dobbie).—White, tinged with pink, with a distinct deep Tyrian Rose eye ; flower 1 inch ; broad, pyramidal truss. 1½ foot.

Erinnye (Chiswick, Dobbie).—White, tinged with violet ; bud blue ; flower 1 inch ; bold, showy truss. 2 feet.

Esclairmonde (Barr, Chiswick).—Deep bluish-lilac, with a paler zone round the eye ; flower 1¾ inch. 3 feet.

Esmé (Barr).—White, tinged with mauve near the eye; dense pyramidal truss; 2 feet.

Esmeralda (Aldersey).—Carmine, with a faint magenta eye, surrounded by a paler band; flower 1¾ inch, flat; broad pyramidal truss. 3 feet. Good.

Espérance (Chiswick, Dobbie, Forbes).—Pale rosy-purple, with white centre; flower 1¾ inch, of good form; bold, dense truss, showy. 2 feet. One of the best of its colour.

Espoir (Forbes), **XXX** July 29, 1909.—White, faintly tinged with lilac, with magenta eye; flower 1¾ inch, of good form; good, vigorous, broad truss. 2½ feet. The best of its colour.

Etienne Lamy (Forbes).—Failed.

Etna (Parr, Forbes), **A.M.** August 8, 1893.—Fiery-red, with a rose eye; flower 1½ inch, of poor form; short, dense, flat truss. 3½ feet. Showy.

Etoile (Barr, Chiswick).—Reddish-violet, with a white eye; flower 1⅛ inch; loose, much-branched truss. 3½ feet.

Etoile de Lyon (Chiswick, Forbes).—Dark bluish-lilac; flower 1½ inch; weak truss. 3 feet.

Eugène Danzanvilliers (Barr, Chiswick, Dobbie), **A.M.** August 10, 1897.—Lilac, with white centre; flower 1½ inch, flat; truss much branched, especially at the base. 2½ feet.

Evelyn (Aldersey).—Deep rosy-pink, tinged with salmon, with faint but well-marked rosy lilac eye; flower 1¾ inch; petals reflexed; large, much-branched truss. 3 feet. A very showy variety.

Fantaisie (Dobbie).—Violet, with a deeper eye, and a pale band round the eye; flower 1½ inch; loose, much-branched truss. Very showy.

Fantasy (Chiswick).—Pure white, slightly rose at the eye; flower 1⅜ inch; oblong truss. 1½ foot.

Fantôme (Barr, Chiswick, Dobbie).—Deep bluish-lilac, with reddish-violet eye; flower 1¾ inch; weak truss, 2 feet. Inferior to Esclairmonde.

Fauvette (Chiswick, Dobbie).—Reddish-violet, with a white eye; flowers poor; dense truss. 1½ foot.

Faust (Chiswick), **XXX** August 30, 1892.—White, with pale magenta eye; flower 1¾ inch, of poor form. 1½ foot.

Favourite (Forbes).—Failed.

F. C. Dotter (Forbes).—Reddish violet, with white eye; flower 1¾ inch, starry. 1 foot.

Fedora (Chiswick, Dobbie).—Pale mauve, with a white zone round the eye; flower 1¾ inch; poor truss. 2 feet.

Fernand Cortez (Barr, Forbes), **XXX** August 12, 1902.—Rosy-magenta, with deep eye, and tinged salmon round the eye; flowers of poor form, starry; broad, well-branched, pyramidal truss. 2 feet. A showy variety.

Feu de Bengal (Barr).—Rosy-carmine, with a deeper eye; flower 1 inch; weak truss. 1½ feet.

Fiancée (Chiswick, Dobbie, Forbes), **A.M.** July 25, 1899.—Pure white, with the faintest tinge of primrose in the eye; flower 1½ inch, of good form; broad, dense truss. 2 feet.

F. J. Marshall (Forbes).—Failed.

Flambeau (Barr, Chiswick, Dobbie), **XXX** Aug. 2, 1892.—Strawberry-red, with deeper eye; flower 1½ inch, well-formed; good pyramidal truss. 2 feet.

Fleur de Neige (Dobbie).—Pure white; flower 1¾ inch; flat, round; broad, much-branched truss. 1¾ foot.

Flocon de Neige (Chiswick, Forbes).—White, with occasional splashes of mauve; flower 1½ inch; vigorous truss. 2 feet.

Florrie Cooper (Forbes).—Pale reddish-violet, with a distinct white eye; flower 1¼ inch, of good form; loose truss. 2 feet.

F. Morton (Forbes).—Failed.

F. Neufchâteau (Forbes).—Bright rosy-pink, with a distinct deeper eye; flower 1¾ inch; of good form; weak truss. 2 feet.

Fort de France (Forbes).—Carmine-lake, tinged fiery-red, with deep rose eye; flower 1¾ inch, of good form: dense, much-branched truss. 2 feet. A showy variety.

Francillon (Barr, Dobbie, Forbes).—Rosy-purple, with deeper eye; flower 1½ inch; poor truss. 2 feet.

François Chabas (Dobbie).—Carmine-crimson, with a deeper eye; flower 1 inch; loose, much-branched truss. 3½ feet. A very showy variety.

François Chabas (Forbes).—White, tinged at edge with deep bluish-lilac; flower 1½ inch; weak truss. 1½ foot.

Frau A. Commerell (Forbes).—Carmine-lake, tinged fiery-red, with deep rose eye; flower 1½ inch; loose truss. 2½ feet. Inferior to Fort de France.

Freifräulein von Lassberg (Barr), **A.M.** Sept. 1, 1908.—Pure white; flower 1¾ inch, flat. 2 feet. A weak grower.

G. A. Ströhlein (Forbes, Barr), **A.M.** Oct. 1, 1907. Bright fiery-red, with rose eye; flower 1½ inch; loose, branched, oblong truss. 3 feet. This variety does not burn so badly as most of its colour.

Géant de Batailles (Chiswick).—White, tinged rose, with carmine eye; flower 1 inch; weak truss. 1½ foot.

Gen. Bréart (Chiswick, Barr).—White, with large magenta eye, suffusing to bluish-lilac; dense pyramidal truss. 3 feet.

Gen. Chanzy (Forbes).—Bright fiery-red; flower 1½ inch, starry; loose, much-branched truss. 3 feet. Very showy, but like many others of the same colour, it burns badly.

Gen. Giovaninelli (Barr, Dobbie, Forbes), **XXX** Aug. 14, 1908.—Carmine-purple, with deeper eye, and a paler region round it; flower 1½ inch; very broad, flat truss. 1¾ foot.

Gen. Van Heutsz (Barr, Forbes).—Bright fiery-red, with large pale rose centre, and magenta eye; very loose, much-branched truss. 2½ feet.

Geoffrey St. Hilaire (Barr, Chiswick, Dobbie, Forbes).—Pale rosy-pink, with reddish-violet eye; flower 1¾ inch; weak truss. 2 feet.

George Goodall (Dobbie).—Carmine-lake; flower 1 inch, of poor form; weak truss. 2 feet.

George Grieve (Forbes).—Failed.

Gilbert (Chiswick).—Deep rose, with carmine eye, and paler band round the eye; flower 1¾ inch; weak truss. 2 feet.

Girondin (Chiswick, Dobbie).—Rosy-carmine with a paler centre, and a rose eye; flower $1\frac{3}{4}$ inch, of good form; broad pyramidal truss. $1\frac{3}{4}$ foot.

Gismonda (Chiswick, Dobbie, Forbes).—Reddish-violet, with distinct white eye; flower $1\frac{3}{4}$ inch,of good form; truss much branched. 2 feet. A good, vigorous, showy variety, one of the best of its colour.

Glendaruel (Forbes).—Failed.

Golphin (Dobbie.—White, tinged with rose, with magenta eye; flower 1 inch; much-branched truss. 2 feet.

Gomez (Barr, Dobbie, Forbes).—Rosy-pink, lightly flaked magenta, with magenta eye; flower $1\frac{1}{2}$ inch; dense, much-branched truss. 1 foot.

G. Planchon (Forbes).—Pale magenta, with a deep magenta eye; flower $1\frac{3}{4}$ inch, curled; weak truss. $1\frac{3}{4}$ foot.

Graf von Onwaroff (Perry).—Rosy-magenta, with a deeper eye; flower $1\frac{1}{4}$ inch; dense pyramidal truss. 3 feet. A showy variety.

Grévin (Barr).—Failed.

Gruppenkönigin (Barr, Forbes, Pfitzer), **A.M.** August 13, 1907.—Pale rose, with a carmine eye; flowers large, of good form; large pyramidal truss. 3 feet. One of the showiest in the trial.

Guignol (Dobbie).—Pale bluish-lilac, with a white eye; flower $1\frac{1}{2}$ inch; much-branched truss. $1\frac{1}{2}$ foot.

Gustave Larroumet (Barr, Dobbie, Forbes).—Pale rose, with white centre; flowers small and of poor form; small, dense pyramidal truss. $1\frac{1}{4}$ foot.

Gustave Nadaud (Dobbie, Forbes).—Bluish-lilac, shading darker to the edge, and tinged with magenta round the eye; broad, dense, pyramidal truss. 2 feet.

Hedwig Stiegler (Forbes).—Failed.

Hélène Vacaresco (Barr, Dobbie, Forbes).—Pure white, with a faint tinge of cream in the eye; flower 2 inches, of good form; dense oblong truss. 1 foot.

Henri Mürger (Chiswick, Barr), **XXX** July 22, 1892.—White, with magenta eye; flower $1\frac{3}{4}$ inch, starry, loose, weak truss. $3\frac{1}{2}$ feet.

Henri Marcel (Forbes).—Carmine-lake, with rose eye, and a pale band round the eye; flower $1\frac{1}{4}$ inch; much-branched truss. $2\frac{1}{2}$ feet.

Henri Regnault (Barr, Forbes).—Bright rosy-pink, with a magenta eye; flower $1\frac{1}{2}$ inch, flat; much-branched truss. $2\frac{1}{2}$ feet. One of the best.

Henri Roujon (Dobbie, Forbes).—Rosy-salmon, slightly deeper towards the eye; flower $1\frac{1}{4}$ inch; dense pyramidal truss. 2 feet.

Henry Royer (Forbes).—Failed.

Hermann Ostertag (Forbes).—Scarlet; flower $1\frac{1}{2}$ inch; dense, pyramidal truss. 3 feet.

Hermione (Dobbie).—White; poor flowers; much-branched truss. 1 foot.

H. Fouquier (Forbes).—Bright fiery-red, with rose eye; flower $1\frac{1}{2}$ inch, of poor form; large flat truss. 2 feet. This variety burns badly.

Hiéroglyphe (Chiswick, Dobbie).—White, tinged with pale rosy-magenta; flower $1\frac{1}{2}$ inch, starry; loose, much-branched truss. 2 feet.

Horizon (Forbes).—Carmine-lake, shading deeper towards the eye; flower 1 inch; weak. 1½ foot.

Huxley (Dobbie, Forbes).—White, petals edged with pale reddish-violet; flower 1¼ inch, of poor form; loose truss. 2 feet.

Ideal (Barr).—Rosy-salmon, slightly tinged with magenta in the eye; flower 1½ inch, of good form; good, dense pyramidal truss. 2 feet.

Inaudi (Barr, Chiswick).—Rosy magenta, with a deeper eye; flower 1½ inch; dense, much-branched pyramidal truss. 2½ feet. Showy, but burns somewhat.

Iona (Dobbie).—Reddish-violet, with a white eye. 2 feet. Inferior to Multiflore.

Iris (Barr, Chiswick, Dobbie, Forbes), **A.M.** August 14, 1891.—Magenta self, with a violet reverse to the petals; flower 1½ inches, flat; large, much-branched truss. 2½ feet. A showy variety.

Isabey (Chiswick).—Failed.

Jas. Bennett (Dobbie).—Pale rosy-pink, with carmine eye; flower 1½ inch; tall, much-branched truss. 3 feet.

Jas. Hamilton (Chiswick).—Deep rosy-magenta self; flower 1¾ inch; large, much-branched, pyramidal truss. 3 feet.

Jas. Lemaire (Chiswick).—Failed.

Javanaise (Barr, Chiswick, Forbes).—Bluish-lilac with white eye; flower 1½ inch, of good form; much-branched, broad truss. 3 feet. Very showy.

Jean Millet (Forbes).—Bluish-lilac, tinged with purple; flower 2 inch, of good form; good flat truss. 3 feet.

Jocelyn (Dobbie).—Scarlet tinged with magenta, with deeper eye; flower 1½ inch; weak truss. 1½ foot.

John Anderson (Dobbie).—Carmine-lake, with magenta eye; flower 1 inch; weak truss. 2½ feet.

John Brunton (Dobbie).—Crimson-carmine; flower ¾ inch; weak truss. 1½ foot.

John Forbes (Dobbie, Forbes), **XX** Aug. 2, 1892.—Mauve, with a deeper eye; flower 1½ inch, of good form; much-branched truss, the side branches well flowered. 3 feet.

John Fraser (Forbes).—Rosy-pink, tinged with fiery-red; flower 1½ inch; good, broad truss. 3 feet.

John Jakeman (Forbes).—Salmon-rose, with magenta eye; flower 1¾ inch, starry; pyramidal truss. 2½ feet.

John Lamont (Forbes).—Rosy-pink, with a deeper eye; flower 1¾ inch; dense, pyramidal truss. 2 feet.

John Stewart (Forbes).—Mauve, with a deep rose eye; flower 1½ inch; much-branched truss. 4 feet. Very vigorous and showy.

Joseph Chamberlain (Forbes).—Crimson-carmine; flower 1½ inch; loose, weak truss. Inferior to Sesostris.

Joséphine Gerbaux (Forbes).—Failed.

Joubert (Dobbie).—White, tinged with blue, with a creamy eye; flower 1¾ inch, good; 1½ foot.

Jourdan (Barr, Chiswick, Dobbie).—Pale rosy-pink tinged salmon; flower 1½ inch; good truss. 2½ feet.

J. P. Robertson (Chiswick).—Pale reddish-violet, with a deeper eye.

which is surrounded by a paler band; flower $1\frac{1}{2}$ inch; dense, oblong truss. $1\frac{1}{2}$ foot.

Jules Breton (Forbes).—Reddish-violet with slightly deeper eye; flower $1\frac{3}{4}$ inch, of poor form; weak truss. $1\frac{1}{2}$ foot.

Jules Cambon (Barr, Dobbie, Forbes), **XXX** Aug. 14, 1908.—Deep rosy-pink, with rose eye; flower $1\frac{1}{2}$ inch; dense pyramidal truss. 2 feet.

Jules Jouey (Chiswick).—Deep bluish-lilac, running to white at the eye; but the tube is dark inside; flower $1\frac{3}{8}$ inch; medium truss. $2\frac{1}{2}$ feet.

Juliette (Dobbie).—White, tinged with lilac; flower $1\frac{1}{4}$ inch, flat; much-branched truss, with well-developed side shoots. 2 feet. A showy, vigorous variety.

Jungfrau (Barr).—Same as Coccinea.

Kossuth (Forbes).—Failed.

Lady de Ramsay (Barr).—Carmine-purple, with magenta eye; flower $1\frac{3}{4}$ inch; weak truss. $3\frac{1}{2}$ feet.

Lady Diana (Barr).—Crimson-carmine self; flower $1\frac{1}{4}$ inch; burns slightly. $3\frac{1}{2}$ feet. This variety had the boldest truss in the whole trial.

Lady Grey (Barr).—Crimson-carmine, with a deeper eye; flower $1\frac{1}{4}$ inch; much-branched, loose, pyramidal truss. $2\frac{1}{2}$ feet.

Lady Grizel (Barr).—White, slightly tinged bluish lilac; flower $1\frac{1}{2}$ inch; good truss. 3 feet.

Lady Hall (Dobbie).—Reddish-violet, shading to white at the edge; flower $1\frac{1}{4}$ inch; dense oblong truss. $1\frac{1}{2}$ feet.

Lady Hermione (Barr).—Rose with a large white centre; flower $1\frac{3}{4}$ inch of good form; bold truss. 4 feet.

Lady Miller (Chiswick, Forbes).—Madder-carmine, with a deeper eye; flower $1\frac{1}{2}$ inch; much-branched truss. 3 feet. A very showy variety.

Lady Molly (Barr).—Mauve, slightly deeper at the eye; flower $1\frac{1}{2}$ inch; pyramidal truss. 3 feet.

Lady Nina Balfour (Forbes).—Pale rosy-lilac, with a deeper eye; flower $\frac{3}{4}$ inch, rather rough; good bold truss. 2 feet.

Lady Raleigh (Forbes).—Carmine-purple, with magenta eye, and a pale zone round it; flowers large; loose pyramidal truss. 3 feet. A showy variety.

Lady Rollin (Chiswick).—Same as Ledru Rollin.

Lady Satanella (Barr).—Bright fiery-red, with a rose eye; flower $1\frac{1}{2}$ inch; broad much-branched truss. 3 feet.

Lady Tate (Forbes).—Delicate rose, with a deeper eye, and an indistinct paler zone round it; flower $1\frac{3}{4}$ inch; good truss. 2 feet.

Lady Tweeddale (Forbes), **XXX** August 14, 1908.—White, faintly tinged with lilac on the reverse of the petals; flower $1\frac{1}{2}$ inch; dense pyramidal truss. 2 feet.

L'Aiglon (Barr, Chiswick).—Carmine-purple, with a deeper eye, with a pale zone round it; flower $1\frac{3}{4}$ inch; broad, dense truss. 3 feet. A showy variety.

La Neige (Chiswick, Forbes).—Pure white, with a trace of cream in the eye; flower $1\frac{3}{4}$ inch; good, broad truss. $1\frac{1}{2}$ foot.

Laniboire (Barr, Dobbie).—Rosy-pink, tinged with bright fiery-red, with magenta eye; flower $1\frac{1}{2}$ inch; loose truss. 3 feet.

La Perle (Forbes).—White, tinged with rose, especially on the reverse of the petals and the tube; flower 1¾ inch; broad, much-branched truss. 1½ foot.

L'Avenir (Dobbie).—Failed.

Lawrence (Chiswick).—White; weak. 1½ feet.

Le Chemineau (Dobbie).—Pale rose, flaked with deeper rose, and shaded magenta near eye, eye surrounded by a paler zone; flower 1½ inch; weak truss. 2½ feet.

Le Donon (Chiswick).—Reddish-violet, tinged with rose at the eye; flower 1¾ inch; dense, small truss. 2 feet.

Ledru Rollin (Chiswick).—Pale reddish-violet with a deeper eye; flower 1½ inch; loose truss. 2 feet.

Le Mahdi (Barr, Forbes), **A.M.** August 15, 1899.—Deep reddish-violet, with a deeper eye; flower 1½ inch; good truss. 2½ feet.

Leonardo da Vinci (Chiswick), **A.M.** September 10, 1895.—Failed.

Léon Guignard (Dobbie, Forbes).—Rosy-pink, with a large white centre; flower 1¼ inch; very broad, much-branched truss. 1½ foot.

Léonnec (Chiswick).—Failed.

Léon Valade (Forbes).—Failed.

Le P. Hacquart (Forbes).—Deep reddish-violet, with a deeper eye; bold, much-branched truss. 2½ feet.

Le Rex (Dobbie).—White, with faint splashes of magenta near the eye; flower 1½ inch, of good form; good truss. 1½ foot.

Le Siècle (Chiswick, Forbes).—Carmine-lake, with a rose eye, and a paler zone round it; flower 1½ inch; much-branched truss. 2 feet.

Le Soleil (Barr), **A.M.** August 10, 1890.—Failed.

Le Vengeur (Forbes), **XXX** August 14, 1902.—Rosy-magenta, with a rose eye; flower 1¾ inch, flat; good truss. 3 feet.

Lewis Chater (Dobbie).—Mauve, with a deeper eye; flower 1½ inch, of good form; weak truss. 2 feet.

Liberté (Forbes).—Rosy-carmine, with a magenta eye; flower 1½ inch; much-branched truss. 3 feet. A showy variety.

Longchamps (Forbes), **XXX** August 16, 1892.—White, with a diffusing magenta eye; flower 1½ inch, of poor form; broad, loose truss. 2½ feet.

Lord Kelvin (Barr, Forbes).—Crimson-lake, tinged with salmon, with a deeper eye; flower 1¾ inch, starry; bold truss. 2½ feet.

Lord Rayleigh (Barr, Forbes), **A.M.** July 27, 1897.—Violet, tinged with magenta, with magenta eye; flower 1¾ inch; broad truss. 2½ feet.

Lothair (Dobbie), **F.C.C.** 1872.—Madder-carmine, with deeper eye; flower 1½ inch; loose, much-branched truss. 2½ feet. A showy variety.

Louis Blanc (Barr, Dobbie, Forbes).—Deep purple, with purplish-maroon eye; flower 1¾ inch; much-branched truss. 3 feet.

Louis Botha (Dobbie).—Lilac purple; flowers large, of poor form; broad truss. 1¼ foot.

Lucy Baltet (Chiswick, Dobbie, Forbes).—Violet-purple, with a white eye, and paler edge to petals; petals reflexing; very loose truss. 2½ feet.

Lucy Genin (Dobbie).—Pure white, with a faint tinge of cream in the eye; flower 1¼ inch, of very good form; broad well-branched truss. 2½ feet.

Lumineux (Chiswick).—Carmine-purple, with a paler band round the eye; flower $1\frac{3}{4}$ inch, waved; pyramidal truss. $2\frac{1}{2}$ feet.

Mme. A. Denis (Barr, Dobbie).—Failed.

Mme. Doriene (Forbes).—Crimson-carmine; flower 1 inch; loose truss. 3 feet. Inferior to Sesostris.

Mme. J. Pfeiffer (Barr).—Crimson-carmine, slightly deeper at the eye; flower $1\frac{1}{2}$ inch, starry; loose, much branched truss. $3\frac{1}{2}$ feet.

Mme. Kruger (Forbes).—Failed.

Mme. M. Carvalho (Barr, Chiswick, Dobbie), **XXX** July 29, 1909.—Pure white on opening, becoming splashed with rose; flower $1\frac{3}{4}$ inch, of good form and substance; large pyramidal truss. 2 feet.

Mme. Necra (Chiswick, Forbes).—White tinged with bluish-lilac, especially on the reverse of the petals; flower $1\frac{3}{4}$ inch; poor truss. $2\frac{1}{2}$ feet.

Magician (Dobbie).—Pale rose, with reddish-violet eye; flower $1\frac{3}{4}$ inch, with reflexed petals; bold, much-branched truss. 2 feet.

Magnet (Dobbie).—Carmine-lake, a little deeper at the eye; flower $1\frac{1}{4}$ inch; large, much-branched truss. 3 feet.

Major Houston (Dobbie).—Magenta, with a darker eye, and a paler zone round the eye; flower $1\frac{1}{2}$ inch; pyramidal truss. 2 feet.

Mandoline (Forbes).—Magenta, with a deeper eye; flower $1\frac{3}{4}$ inch; weak truss. $1\frac{1}{4}$ foot.

Manon (Chiswick).—Failed.

Marchioness of Linlithgow (Forbes).—Failed.

Mariette (Barr, Dobbie),—Reddish-violet, with a deeper eye; flower $1\frac{3}{4}$ inch; flat; good truss. $1\frac{1}{2}$ foot.

Marinette (Forbes).—Salmon-pink, with a rose eye; flower 1 inch; poor truss. $1\frac{1}{2}$ foot.

Marquis de Breteuil (Barr, Dobbie).—Rose, with a deeper eye, and a pale zone round the eye; flower $1\frac{1}{2}$ inch; much-branched pyramidal truss. $1\frac{1}{2}$ foot.

Martinique (Barr).—Rose, with a deep magenta eye; flower $1\frac{1}{2}$ inch; poor truss.

Masaccio (Forbes).—Reddish-violet, with a paler eye; flower 2 inches, of good form; dense, compact truss. 2 feet.

Maspèro (Chiswick).—Rosy-magenta, slightly paler at the eye; flower $1\frac{1}{2}$ inch; broad, flat truss. 2 feet.

Maspèro (Barr, Dobbie, Forbes).—Mauve, flushed pale reddish-violet, with a deeper eye; flower $1\frac{3}{4}$ inch, of good form; good oblong truss. $1\frac{1}{2}$ foot.

Massenet (Barr, Chiswick, Forbes).—Lilac, with lilac-purple eye; flower $1\frac{3}{8}$ inch; broad pyramidal truss. 2 feet.

Massillon (Chiswick).—Mauve, with magenta eye; flower $1\frac{3}{4}$ inch; weak oblong truss. 2 feet.

Matador (Forbes), **XXX** July 27, 1894.—Strawberry-red, with a slightly deeper eye; flower $1\frac{1}{2}$ inch, flat; pyramidal truss. $2\frac{1}{2}$ feet.

M. Serao (Chiswick, Forbes).—White, with occasional splashes of rose; flower $1\frac{3}{4}$ inch; good symmetrical truss. $2\frac{1}{2}$ feet. A showy variety with well-formed flowers.

Maupertuis (Barr, Forbes).—White tinged with bluish-lilac, with a distinct magenta eye; flowers rather small; poor truss. 2 feet.

Maximilien (Forbes).—Failed.

Memphis (Barr, Chiswick, Dobbie).—White, tinged with magenta, with magenta eye; flower $1\frac{3}{4}$ inch; dense, broad, pyramidal truss. 2 feet.

Mentmore (Forbes).—Rosy-magenta with a rose eye; flower $1\frac{1}{2}$ inch; much-branched pyramidal truss. $2\frac{1}{2}$ feet.

Merlin (Dobbie).—Rosy-magenta, with a deeper eye; flower $1\frac{1}{2}$ inch; good, well-branched truss. $2\frac{1}{2}$ feet.

Météore (Barr).—Rosy-pink, tinged with salmon, with a large white eye; flower $1\frac{3}{4}$ inch, flat; bold truss. 3 feet.

Mignonne (Dobbie).—Pale rosy-purple, with a white centre; flower $1\frac{1}{2}$ inch; good, much-branched truss. 2 feet.

Miramar (Dobbie).—Rosy-salmon, with a deep rose eye; flower $1\frac{3}{4}$ inch, starry; good truss. $2\frac{1}{2}$ feet. This variety burns badly.

Miramar (Forbes).—Reddish-violet, with magenta eye, and a paler zone round it; flower $1\frac{1}{2}$ inch; dense pyramidal truss. $1\frac{1}{2}$ feet.

Miss Bouverie (Forbes).—Failed.

Miss Pemberton (Forbes), **A.M.** September 21, 1897.—Salmon-pink, with a deep rose eye; flower $1\frac{3}{4}$ inch, of good form; dense pyramidal truss. 2 feet.

Miss Willmott (Forbes).—Failed.

Miss Wilson (Forbes).—Carmine-purple, with a tinge of salmon; flower $1\frac{1}{2}$ inch, of poor form; dense, broad, much-branched truss. $1\frac{3}{4}$ foot. A very showy variety.

Model (Dobbie).—Rosy-purple, with white eye; flower $1\frac{3}{4}$ inch; dense truss. $1\frac{1}{2}$ foot. A showy and vigorous variety.

Molière (Barr, Dobbie, Forbes), **A.M.** September 12, 1893.—Pale rosy-pink, tinged with salmon, with a deeper eye; flower $1\frac{3}{4}$ inch; good broad truss. 3 feet.

Montagnard (Chiswick, Dobbie, Forbes).—Rosy-magenta, with a paler zone round the eye; flower $1\frac{1}{2}$ inch; poor truss. $1\frac{1}{2}$ foot.

Montrose (Dobbie, Forbes).—Salmon-pink, with deep rose eye; flower $1\frac{3}{4}$ inch; flat, much-branched truss. 2 feet. Showy.

M. Bezanson (Forbes).—Rosy-carmine, tinged fiery-red, with a deeper eye; flower $1\frac{1}{4}$ inch; good truss. 3 feet.

M. Duponchel (Barr, Forbes).—Bright rosy-purple, with a white centre; flower $1\frac{1}{4}$ inch, not flat; large, broad truss. $1\frac{3}{4}$ foot.

M. Linden (Forbes).—Carmine-lake, deepening towards the eye; flower $1\frac{1}{2}$ inch; good, bold, much-branched truss. 3 feet.

M. W. Bull (Dobbie).—Pale mauve, with a lighter eye; much-branched truss. $2\frac{1}{2}$ feet.

Mounet Sully (Barr, Forbes), **XXX** August 12, 1909.—Bright fiery-red, with rose eye; flower $1\frac{1}{2}$ inch; truss much-branched from the base. 3 feet. A showy variety, but it burns badly.

Mozart (Dobbie, Forbes).—Magenta, with white centre; flower $1\frac{1}{2}$ inch; weak oblong truss. $1\frac{1}{2}$ foot.

M. P. Carpentier (Chiswick).—Failed.

Mr. Gladstone (Dobbie, Forbes).—Pale rosy-pink, with rose eye; flower $1\frac{1}{2}$ inch; weak truss. 2 feet.

Mrs. Aberdeen (Forbes).—Crimson-carmine self; flower 1⅛ inch, flat; broad, flat truss. 2½ feet. Very showy.

Mrs. A. Browning (Forbes).—Fiery-red, tinged with rose; flower 1¼ inch; loose truss. 3½ feet.

Mrs. Brook (Forbes).—Madder-carmine, with magenta eye; flower 1½ inch; loose spike. 3 feet.

Mrs. Burn (Forbes).—Bright fiery-red, with rose eye; flowers small, curled; dense, flat truss. 2 feet. This variety burns.

Mrs. Butters (Forbes).—Dark magenta, with a white eye; flower 1½ inch, of good form; good, bold, much-branched truss. Very showy.

Mrs. Callender (Forbes).—Rosy-pink, tinged with salmon, with a white zone round the eye; flower 1½ inch; dense, flat, truss. 2 feet.

Mrs. Derring (Forbes).—Carmine-lake, tinged salmon; flower 1½ inch; broad, well-branched truss. 2½ feet. Very free and showy, but burns somewhat.

Mrs. G. Wigan (Forbes).—Rosy-magenta, with a deeper eye; flower 1½ inch, flat; good, bold truss. 2½ feet. Showy.

Mrs. Jas. Farquhar (Chiswick, Forbes).—Rosy-pink, tinged with salmon; dense truss. 2 feet.

Mrs. Jenkyns (Barr).—Pure white, with a trace of cream in the eye; flower 1¼ inch; truss branched from base. 2 feet.

Mrs. McCallum (Dobbie).—White, tinged with magenta, with Tyrian rose eye; flower 1¼ inch; weak truss. 3 feet.

Mrs. McLeod (Forbes).—Rosy-pink, tinged with salmon, with magenta eye, surrounded with white; flower 1½ inch; good truss. 2½ feet.

Mrs. Oliver (Barr, Chiswick, Forbes).—Bright rosy-pink, with a white centre; flower 1½ inch, of good form; broad, much-branched truss. 2½ feet. A very showy, late variety.

Mrs. S. Standing (Barr).—Rose, with well-defined deep rosy-magenta eye; flower 1¼ inch; dense pyramidal truss. 3 feet.

Mrs. Tilney (Aldersey).—Deep rosy-pink, with a pale zone round the eye; flower 1¾ inch, of good form; much-branched truss. 3 feet.

Mrs. W. P. Wright (Forbes).—Rosy-magenta, with a deeper eye; flower 1¾ inch, of good form; good bold truss. 3½ feet. One of the best, and remains in good condition for many weeks.

Mrs. Younger (Forbes).—Reddish-violet with darker eye, and a pale zone round it; flower 1¼ inch; good much-branched truss. 3 feet. A showy and vigorous variety.

Multiflore (Barr, Forbes).—Reddish-violet, with large distinct white eye; flower 1½ inch; good truss. 1½ foot.

Muriel Rogers (Forbes), **XXX** July 29, 1909.—Rosy-red, with large carmine-purple eye; flower 1⅝ inch; flat; much-branched, broad, pyramidal truss. 2 feet. A very good variety, flowering in late July.

Neil Glas (Dobbie).— Failed.

Nuée (Dobbie).—Same as Mignonne.

Obélisque (Barr, Dobbie, Forbes).—Rosy-pink with deep rose eye; flower 1 inch; pyramidal truss. 2 feet.

Obergartner Mack (Forbes).—Rose-red, with rose eye; flower 1⅞ inch; dense truss. 3 feet. A showy variety.

Œil de Rouge (Chiswick).—Dark purple; flower 1⅜ inch; broad pyramidal panicle. 2¼ feet. This variety burns badly.

Offenbach (Dobbie).—White, tinged on reverse of petals with bluish-lilac and purple; flower 1¼ inch; flat truss. 1½ foot.

Opale (Dobbie).—Failed.

Opera (Barr).—Failed.

Ophir (Dobbie).—Rosy-magenta, with a deeper eye; flower 1¼ inch; good, much-branched truss. 2½ feet.

Orientale (Barr, Chiswick).—Deep mauve, with irregular white markings; flower 1¾ inch; dense pyramidal truss. 3 feet.

Ormonde (Barr).—Carmine-purple, slightly deeper at the eye; flower 1¾ inch; good truss. 2 feet.

Panama (Chiswick), **XXX** August 30, 1892.—Pure white; flower 1½ inch; dense pyramidal truss. 1½ foot. A showy variety.

Panorama (Barr), **XX** August 16, 1892.—Mauve, with a distinct white eye, and a pale mauve band round it; flower 1 inch; dense broad truss. 1½ foot.

Pantheon (Barr, Dobbie, Forbes), **XXX** August 16, 1892.—Salmon-rose, with magenta eye, and a pale zone round it; broad pyramidal truss. 2½ feet.

Papillon (Chiswick).—Pale violet; poor truss. 2½ feet.

Parachute (Chiswick, Dobbie).—Rosy-purple, with a white centre; flower 1¼ inch, of poor form; broad truss. 1 foot.

Paragon (Dobbie).—Violet tinged with rose at the eye; flower 1½ inch; bold much-branched truss. 3 feet. A showy late variety.

Parthenon (Barr, Chiswick).—Reddish-violet, with a white centre. 1 foot. Weak.

Pat Robertson (Chiswick, Forbes).—Failed.

Paul Bert (Barr), **XXX** August 16, 1892.—White, heavily tinged with bluish-lilac, with a distinct pale magenta eye; flower 1½ inch; weak truss. 3 feet.

Paul Fliche (Forbes).—Pale mauve, with a deeper eye; flowers large. 2 feet. A showy variety, with well-formed flowers.

Paul Hariot (Dobbie, Forbes).—Pale rose, with a deeper eye, and a pale zone round it; flower 1¼ inch, with reflexed petals; broad much-branched truss. 2 feet.

Paul Martin (Barr).—Carmine-lake, with a pale magenta eye, surrounded by a pale zone; flowers of good form; loose pyramidal truss. 2 feet.

P. Bonnetain (Forbes).—Mauve, with a slightly deeper eye; flower 1¼ inch, of good form; good bold truss. 2½ feet.

Pêcheur d'Islande (Chiswick).—Carmine-purple; flower 1¼ inch, flat; long pyramidal truss. 2½ feet.

Pharaon (Barr, Chiswick, Dobbie).—Pale magenta, with large irregular white centre; flower 1¼ inch, of excellent form; very broad pyramidal truss. 2 feet. A very good variety.

Philibert Audebrand (Forbes).—White with a magenta eye; flower 1¾ inch; weak truss. 1½ foot.

Pierre le Grand (Dobbie, Forbes).—Rich rosy-magenta, with a small paler zone in the centre; flower 1¾ inch, of good form; flat, much-branched truss. 2 feet.

Pink Perfection (Barr).—Rose, with magenta eye; weak. $1\frac{3}{4}$ foot.

Plantagenet (Chiswick).—Failed.

Pline (Forbes).—Pure white, with a well-defined magenta eye; flower 2 inches, of splendid form. $1\frac{1}{2}$ foot. Rather a weak grower.

Poussin (Dobbie, Forbes).—White, much tinged with lilac; flower $1\frac{3}{4}$ inch; weak truss. $1\frac{1}{2}$ foot.

Prince d'Arenberg (Forbes).—Lilac-white, with magenta eye; flower $1\frac{1}{4}$ inch; good flat truss. $1\frac{1}{2}$ foot.

Prince of Wales (Forbes).—White, with deep Tyrian rose eye; flower $\frac{3}{4}$ inch; loose, much-branched, pyramidal truss. $3\frac{1}{2}$ feet. Very showy.

Printemps (Forbes).—Failed.

Professor Nocard (Barr, Dobbie, Forbes).—Rosy-carmine with a deeper eye, and a pale zone round it; flower $1\frac{1}{2}$ inch; small, dense, pyramidal truss. 1 foot.

Professor Virchow (Barr, Forbes).—Failed.

Profusion (Chiswick, Barr, Forbes).—Mauve, slightly deeper at the eye; flower $1\frac{3}{4}$ inch, of good form; dense, broad truss. $2\frac{1}{2}$ feet.

Prosper Henry (Barr, Forbes), **XXX** September 14, 1908.—White, with magenta eye; flower $1\frac{3}{4}$ inch, of good form; much-branched pyramidal truss. 2 feet.

Pureté (Forbes), **XX** August 2, 1892.—Pure white, with faintest tinge of cream in the eye; flower 1 inch; broad, loose truss. $1\frac{1}{2}$ foot.

Purple Emperor (Dobbie).—Pale rosy-pink, with a well-defined deeper eye; flower $1\frac{1}{4}$ inch; dense oblong truss. 2 feet.

Pyramid (Chiswick, Dobbie).—Pure white; flower $1\frac{3}{4}$ inch, of good form; broad, dense, pyramidal truss. $1\frac{1}{2}$ foot.

Rachel (Forbes).—Pale reddish-violet; flowers starry; weak truss. 2 feet.

Redoute (Forbes).—Reddish-violet, fading to rose, with white centre; flower $1\frac{3}{4}$ inch, of good form; broad, dense truss.

Regulus (Barr, Chiswick, Forbes), **XXX** August 16, 1892.—Carmine-purple, with a paler eye; flower $1\frac{1}{4}$ inch, of good form; 2 feet.

Reichsgraf von Hochberg (Barr).—Rich crimson-carmine self; flower $1\frac{3}{4}$ inch; flat, vigorous truss. $3\frac{1}{2}$ feet. A showy variety, but burns badly.

Renommé (Chiswick).—Failed.

Rheingau (Barr).—Pure white, with a tinge of rose in the eye; flower $1\frac{3}{4}$ inch, of good form; much-branched truss. 2 feet.

Richepin (Barr).—Pale rosy, magenta, with a deeper eye; flower $1\frac{1}{2}$ inch; bold, pyramidal truss. $2\frac{1}{2}$ feet.

Robert Pringle (Forbes).—Carmine-lake, tinged with fiery red, with a deeper eye; flower $1\frac{1}{2}$ inch, of poor form; weak, loose truss. 3 feet.

Robur (Barr).—Crimson-carmine; flower $1\frac{1}{4}$ inch; poor, weak truss. $1\frac{1}{2}$ foot.

Roger Marx (Forbes).—Failed.

Roi des Roses (Chiswick, Forbes), **XX** August 2, 1892.—Salmon-rose, with a deeper eye; flower $1\frac{1}{4}$ inch, of good form; loose, much-branched truss. 3 feet. A showy variety.

Rose Caron (Forbes).—Failed.

Rossignol (Chiswick).—Failed.

Roxelane (Barr, Chiswick, Forbes).—Crimson-carmine, with a deep eye; flower 1¾ inch, of good form; weak truss. 1½ foot.

Royal Purple (Dobbie).—Reddish-violet, with a slightly deeper eye; flower 1¾ inch, flat; vigorous. 2 feet.

Rubis (Forbes).—Crimson-carmine, with a deeper eye; flower 1¼ inch; small truss. 3 feet. Late.

Salmonea (Forbes).—Rosy-salmon, with a deeper eye; flowers did not expand properly; weak truss. 2 feet.

Salvator Rosa (Barr).—Lilac, with large white centre; flower 1¾ inch, flat, but rather thin; much-branched truss. 2 feet.

Schliemann (Barr).—Failed.

Seduction (Forbes).—Reddish-violet, with white centre; flower 1½ inch; pyramidal truss. 3 feet.

Selection (Dobbie).—Pale rosy-purple with white centre; flower 1¼ inch, flat; loose truss. 2 feet. Very free and showy.

Selma (Barr).—Rose, with magenta eye; flower 1¾ inch; large, pyramidal truss. 3 feet.

Sergent Lovy (Forbes).—Rosy-pink, with white centre and magenta eye; flower 2 inches; flat truss. 2½ feet.

Sesostris (Chiswick, Dobbie, Forbes), **XXX** August 14, 1908. Rich crimson-carmine, shaded maroon at eye; flower 1¾ inch, of good form; good truss. 3 feet. The best of its colour.

Sheriff Ivory (Barr, Dobbie, Forbes).—Rose, with a crimson eye; flower 1¾ inch; of good form and substance; good pyramidal truss. 3½ feet. A very showy variety.

Shirley Hibberd (Forbes).—Rose; flowers small, of good form; dense truss. 2½ feet.

Siebold (Barr, Dobbie, Forbes, Perry), **XXX** August 14, 1908.—Bright fiery red, with rose eye; flower 1½ inch, flat; broad, much-branched truss. 3 feet. A very showy variety, but it burns somewhat.

Sir Dighton Probyn (Forbes).—Rose-red tinged; flowers small, and do not open well; weak truss. 3 feet.

Sir Fred. Leighton (Barr).—Rose-pink, with a deeper eye; flower 1¾ inch, starry; dense truss. 3 feet. Showy.

Sir Jas. Douglas (Dobbie).—Madder-carmine, with magenta eye; flowers small: much-branched truss. 2½ feet.

Snow Queen (Barr).—Pure white; flower 1½ inch, of good form and substance; dense, pyramidal truss. 2 feet. One of the best whites.

Solon (Barr, Forbes).—Carmine, tinged with fiery-red, with magenta eye; flower 1¼ inch; good truss. 2½ feet. Showy.

Sphinx (Barr, Dobbie, Forbes).—Rosy-carmine, with white centre; flower 1¾ inch, of excellent form; dense pyramidal truss. 2½ feet.

Spirite (Barr).—Rose-white, with a magenta eye; flower 1¾ inch, flat; good full truss. 1¼ foot.

Splendens (Barr, Chiswick).—Failed.

Stanislas (Barr).—Rosy-magenta, with a deeper eye; flower 1¾ inch; broad, flat, loose truss. 3 feet.

Startler (Dobbie).—Rose, tinged with salmon, with a deep rose eye; flower 1½ inch; weak truss. 2 feet.

Stendhal (Barr).—Same as Lady Satanella.

Suffrage (Chiswick, Dobbie).—Rosy-salmon, with magenta eye; flower $1\frac{3}{4}$ inch; good, vigorous truss. 2 foot.

Sylphide (Barr, Chiswick, Dobbie), **A.M.** September 24, 1902.—Pure white, with faint tinge of cream in the eye; flower $1\frac{1}{4}$ inch; weak truss. $1\frac{1}{2}$ foot.

Talma (Barr, Forbes).—Reddish-violet with a slightly paler eye; flower $1\frac{3}{4}$ inch, of good form; weak truss. 2 feet.

Tambour de Wattignies (Forbes).—Deep bluish-lilac, with white centre; flower $1\frac{1}{4}$ inch; weak truss. 1 foot.

Tapis Blanc (Barr, Chiswick, Dobbie), **A.M.** August 28, 1906.—Pure white, slightly tinged with primrose at the eye; flower $1\frac{3}{4}$ inch, with reflexed petals; broad, much-branched truss. 1 foot.

Tempête (Barr).—Failed.

Thébaïde (Chiswick).—Failed.

The Queen (Dobbie).—White, with a faint tinge of lilac, and magenta eye; flower $1\frac{1}{2}$ inch, of good form; dense truss. 2 feet.

Theresa (Forbes).—Failed.

Thos. Hay (Forbes).—Carmine-lake, tinged with fiery-red, with a deeper eye; flower $1\frac{1}{2}$ inch; poor oblong truss. 2 feet.

Thos. Swanston (Forbes).—Crimson-carmine self; flower $1\frac{1}{8}$ inch, flat; loose, pyramidal truss. 3 feet.

Tivoli (Chiswick, Dobbie).—Deep reddish-violet, with a darker eye; flower $1\frac{1}{2}$ inch; dense, flat truss. 2 feet. A showy variety.

Tom Welsh (Barr, Forbes).—Carmine-lake, tinged with salmon; flower $1\frac{1}{4}$ inch, of good form; loose pyramidal truss. 3 feet.

Too Too The Pink (Barr).—Pale rosy-salmon, tinged with magenta round the eye; flower $1\frac{1}{2}$ inch, flat; much-branched truss. $3\frac{1}{2}$ feet. A showy variety.

Toreador (Barr).—Carmine-lake, with a magenta eye; flower $1\frac{1}{2}$ inch, of good form; good pyramidal truss. $1\frac{1}{2}$ foot.

Torpilleur (Forbes), **A.M.** July 27, 1897.—Bright rosy-red, with a magenta eye; flower $1\frac{3}{4}$ inch, flat; much-branched truss. 2 feet.

Tourbillon (Chiswick, Dobbie, Forbes).—Rosy-magenta, tinged with white round the eye; flower $1\frac{3}{4}$ inch, flat; good truss. $2\frac{1}{2}$ feet.

Tunisie (Forbes).—Bluish-lilac, splashed with purple, with purple eye; flower $1\frac{1}{2}$ inch; loose, much-branched truss. $2\frac{1}{2}$ feet.

Von Lassberg (Forbes).—Same as Freifräulein von Lassberg.

W. J. Marlow (Forbes).—White, with a faint trace of primrose in the eye; flower $1\frac{3}{4}$ inch; well-branched pyramidal truss. $2\frac{1}{2}$ feet.

Wm. Muir (Barr, Chiswick), **XXX** August 16, 1892.—Reddish-violet, with a distinct carmine eye; flower $1\frac{1}{4}$ inch; loose truss. 3 feet.

W. Ramsay (Barr).—Crimson-carmine, with a deeper eye; flower $1\frac{1}{2}$ inch; loose, weak truss. $2\frac{1}{2}$ feet.

W. Robinson (Barr, Dobbie, Forbes), **XXX** August 16, 1892.—Rosy-salmon, with a deeper eye; large, well-formed flowers; good truss. 3 feet.

Zouave (Chiswick, Forbes).—Reddish-violet, with a distinct deeper eye; flower $1\frac{3}{4}$ inch, of good form; pyramidal truss. $2\frac{1}{2}$ feet.

FRENCH AND RUNNER BEANS AT WISLEY, 1909.

One hundred and fifteen stocks of dwarf French beans, nineteen of climbing French beans, and twenty-four of runner beans were received for trial. All the dwarf ones were sown the third week in April, and all the runner section on May 14. The soil had been well prepared and moderately manured, and in most cases the germination was excellent. The whole collection did so well, that the Fruit and Vegetable Committee wished it to be recorded that it was the best trial of beans they had ever seen. The dwarf beans were sown in rows 3 feet apart, and 6 inches apart in the rows; and the runner varieties were sown in rows 6 feet apart, and 6 inches apart in the rows. The Fruit and Vegetable Committee examined the stocks on three occasions.

F.C.C.=First-class Certificate.
A.M.=Award of Merit.
XXX=Highly Commended.

Dwarf French Beans.

*1. Best of All (Carter).—Growth moderately vigorous; foliage dark green; leaflets small, pointed; flowers pinkish-white; pods light green, 3–6 inches long; seed pale dun, with rosy purple streaks; crop poor.

2. Black Speckled (Carter).—Growth vigorous; foliage dark green; leaflets pointed; flowers pale lilac; pods light green, 4–6 inches long; inclined to run; seed brown, black mottled; crop poor.

3. Black Wax (Carter).—Growth vigorous; foliage light green; leaflets blunt and rounded; flowers dark lilac; pods yellow, 4–6 inches long; seed black; crop good.

4. Canadian Glory (Carter).—Growth vigorous; foliage dark green; leaflets pointed, very rounded; flowers white, tinged with pink; pods light green, 4–6 inches long; seed dark dun; crop good.

5. Canadian Wonder (Dobbie), **F.C.C.** September 1, 1903.—Growth vigorous; leaflets large and pointed; flowers white; pods light green, 5–7 inches long; seed purple; crop heavy.

6. Canadian Wonder (Vilmorin). — Similar to No. 5; flowers pale pink.

7. Canadian Wonder (selected) (Massey).—Similar to No. 5; flowers pale pink.

8. Canadian Wonder (improved) (Barr).—Similar to No. 5; flowers pale pink.

9. Canadian Wonder (original) (Carter).—Similar to No. 5; flowers pale pink.

10. Canadian Wonder (re-selected) (Carter).—Similar to No. 5; flowers pale pink; seed purple, larger.

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* See footnote, p. 429.

11. Centenary (Carter).—Growth fairly vigorous; foliage dark green; leaflets small, pointed; flowers white; pods yellow, waxy, 3–4 inches long; seed white, with purplish-black splashes; crop good.

12. China (Carter).—Growth moderate; foliage dark green; leaflets small, blunt; pods light green, 4 inches long, slightly rounded; seed creamy-white; crop poor.

13. Cholet (Vilmorin), **XXX** August 12, 1909.—Growth vigorous; foliage dark green; leaflets small, pointed; flowers pale pinkish-white; pods light green, 4–6 inches long; seed very pale dun; very heavy crop.

14. Dwarf Abundance (Vilmorin).—Growth moderate; foliage dark green; leaflets small, pointed; flowers pale pinkish-white; pods light green, 4 inches long; seed pale brownish-purple; crop fair.

15. Dwarf Caseknife (Carter).—Growth moderate; foliage dark green; leaflets small, blunt; flowers white; pods light green, 3–4 inches long; seed white; crop good.

16. Dwarf Perreux (Vilmorin).—Growth moderate; foliage dark green; leaflets small, pointed; flowers very pale pinkish-white; pods light green, 4 inches long; seed very pale dun; crop moderate.

17. Dwarf Prolific (Barr).—Growth moderate; foliage dark green; flowers white; pods light green, 4–5 inches long, flat; seed dark dun; crop good.

18. Dwarf Soissons (Vilmorin).—Growth moderate; foliage dark green; leaflets small, blunt; flowers white; pods light green, 3–4 inches long, flat; seed white; crop poor.

19. Dwarf Sugar (Sutton).—Growth moderate; foliage light green; leaflets pointed; flowers pale pink; pods light green, 4–5 inches long, rounded; seed pale dun with rose streaks; crop good; very dwarf.

20. Dwarf White Swiss (Vilmorin).—Growth moderate; foliage dark green; leaflets small, blunt; flowers white; pods light green, 4–5 inches long, flat; seed white; crop good.

21. Earliest of All (Carter).—Growth vigorous; foliage dark green; leaflets small, pointed; flowers pale lilac; pods pale green, 4 inches long, rounded; seed yellow; crop moderate.

22. Earliest Long Sword (Spruyt).—Growth moderate; foliage dark green; leaflets small, pointed; flowers white; pods light green, 3–4 inches long, flat; seed white; crop poor; very dwarf.

23. Early Dun (J. Veitch).—Growth vigorous; foliage dark green; leaflets blunt; flowers yellowish-white; pods yellow, waxy, 4 inches long, rounded; seed dark dun, heavily marked dark brown; crop good.

24. Early Dwarf Butter (Vilmorin), **F.C.C.** August 5, 1873.—Growth moderate; foliage light green; leaflets pointed; flowers dark pink; pods yellow, waxy, 4 inches long; seed black; crop good.

25, 26. Early Favourite (Veitch, Carter).—Growth vigorous; foliage dark green; leaflets blunt; flowers pale lilac; pods light green, 4–5 inches long, flattish; seed pale dun, heavily marked purplish-brown; crop good.

27. Early Forcing (Carter).—Growth moderate; foliage dark green; leaflets, small pointed; flowers white, tinged with pink; pods light green, 3–4 inches long, flat; seed dark dun; crop poor.

28, 29. Early Gem, Wythe's (J. Veitch, Carter).—Growth vigorous; foliage dark green; leaflets small, pointed; flowers white and scarlet; pods light green, 4 inches long, rounded; seed very pale dun; crop good.

30. Early Green (Vilmorin).—Growth moderate; foliage dark green; leaflets small, blunt; flowers yellowish-white; pods dark green, 4–5 inches long, flattish; seed green; crop poor.

31. Early Prolific (Carter).—Growth very vigorous; foliage dark green; leaflets pointed; flowers pale pink; pods light green, 4–5 inches long, rounded; seed pale dun, very heavily marked; crop good.

32. Early Warwick (Carter).—Growth vigorous; foliage dark green; leaflets pointed; flowers lilac; pods light green, 4–5 inches long, flat; seed pale dun; crop moderate.

33. Early Wonder (J. Veitch).—Growth vigorous; foliage dark green; leaflets pointed; flowers scarlet; pods light green, 4 inches long, flattish; seed dark dun, black markings; crop good.

34. Eclipse (Massey).—Growth very vigorous; foliage dark green; leaflets pointed; flowers lilac; pods pale green, 4 inches long, rounded; seed very dark dun; crop good.

35. Emperor of Russia (J. Veitch).—Growth vigorous, inclined to run; foliage dark green; leaflets pointed; flowers lilac; pods light green, 4–5 inches long, rounded; seed pale dun, marked with purple; crop good.

36. Emperor William (Carter), **A.M.** April 27, 1897, as a forcing variety.—White, growth moderate; foliage dark green; leaflets pointed; flowers white; pods light green, 4 inches long, flat; crop rather poor.

37. Emperor William Improved (Carter).—Similar to No. 36; seed greenish brown.

38. Everbearing (Carter), **A.M.** July 25, 1899.—Growth weak; foliage light green; leaflets pointed, small; flowers white; pods dark green, 4 inches long, flat; seed white, small; crop good.

39. Everyday (J. Veitch).—Growth vigorous, inclined to run; foliage light green; leaflets pointed; flowers pale pink; pods light green, 4 inches long, flat; seed pale dun; crop good.

40. Evergreen (Sutton), **XXX** September 28, 1909.—Growth vigorous; foliage dark green; leaflets small, pointed; flowers pinkish-white; pods, light green, 4–5 inches long, flattish; seed pale dun; good crop.

41. Excelsior (Barr), **XXX** August 12, 1909.—Growth moderate; foliage light green; leaflets pointed; flowers pinkish-white; pods light green, 5 inches long, round; seed pale dun; good crop.

42. First Crop (Heinemann).—Growth dwarf; foliage dark green; leaflets small, pointed; flowers white; pods dark green, 3–4 inches long, flat; seed pale green; good crop.

43. Flagelot Long Podded (Vilmorin).—Growth moderate; foliage dark green; leaflets small, pointed; flowers white; pods dark green, 4 inches long, round; seed white; good crop.

44. Forcing (Sutton).—Dwarf; foliage dark green; leaflets small, pointed; flowers pale lilac; pods light green, 3 inches long, round; seed dark dun; crop poor.

45. Fulmer's Forcing (Carter).—Growth moderate; foliage dark green; leaflets pointed; flowers pale lilac; pods light green, 4 inches long, flattish; seed dark dun; heavily marked reddish-purple; crop good.

46. Giant Scimitar Wax (Heinemann).—Growth vigorous; foliage dark green; leaflets pointed; flowers pinkish-white; pods yellow, waxy, 4 inches long, flat; seed purplish-black; crop moderate.

47. Golden Prolific (Barr).—Growth vigorous; foliage dark green; leaflets blunt; flowers white; pods yellow, waxy, 5–6 inches long, flat; seed white; crop good.

48. Golden Wax (Imperial) (Carter).—Growth vigorous; foliage dark green, leaflets blunt, flowers white; pods yellow waxy, 3–4 inches long, flat; seed white, with black stripe on side; crop good.

49. Golden Wax (Rustproof) (Carter).—Growth vigorous; foliage dark green; leaflets pointed; flowers light scarlet; pods yellow, waxy, 4 inches long, rounded; seed violet-black; crop good.

50. Golden Waxpod (Barr), **A.M.** August 27, 1897.—Growth vigorous; foliage dark green; leaflets pointed; flowers scarlet and white; pods yellow, waxy, 4 inches long, rounded; seed black; crop good.

51. Golden Waxpod (J. Veitch).—Growth moderate; foliage dark green; leaflets pointed; flowers scarlet; pods yellow, waxy, 4 inches long, rounded; seed black; crop good.

52. Goliath (Dobbie).—Growth vigorous; foliage dark green; leaflets blunt; flowers light scarlet; pods light green, 4-5 inches long, flat; seed black; crop good.

53. Green Gem (Sutton).—Growth moderate; foliage dark green; leaflets small, blunt; flowers yellowish-white; pods dark green, 3–4 inches long, rounded; seed pale green; crop moderate.

54, 55. Green Haricot (Carter, Barr).—Growth moderately vigorous; foliage dark green; leaflets small, pointed; flowers white; pods light green; 4 inches long, rounded; seed pale green; crop poor.

56. Hinrich's Giant Sugar (Heinemann).—Growth vigorous; foliage dark green; leaflets large, pointed; flowers light scarlet; pods light green, 3–4 inches long, rounded; seed very pale dun; crop good.

57. Hinrich's Giant Sugar (Heinemann).—Growth moderate; foliage dark green; leaflets large, blunt; flowers scarlet and white; pods light green, 4 inches long, rounded; seed white; crop poor.

58. Hodson Wax (R. Veitch).—Growth vigorous; foliage dark green; leaflets pointed; inclined to run; flowers pink; pods yellow, waxy, 4 inches long, rounded; seed pale dun; crop good.

59. Holborn Wonder (Carter).—Growth vigorous; foliage dark green; leaflets pointed; flowers pale scarlet; pods light green, 4-5 inches long, rounded; seed pale dun; crop good.

60. Improved Early Giant Green Haricot (Carter).—Growth moderate; foliage dark green; leaflets blunt; flowers yellowish-white; pods dark green, 5–6 inches long, flat; seed pale green; crop good.

61. Kaiser (R. Veitch).—Growth vigorous; foliage dark green; leaflets small, pointed; flowers scarlet; pods light green, 4–5 inches long, flat; seed dark dun; crop good.

62. Kingston Gem (Dobbie), **A.M.** September 1, 1903.—Growth very vigorous; foliage dark green; leaflets large, pointed; flowers pinkish-white; pods light green, 4 inches long, flat; seed dark dun; crop poor.

63. Longsword (Carter).—Growth vigorous; foliage dark green;

leaflets small, pointed; flowers yellowish-white; pods light green, 4 inches long, flat; seed white; crop poor.

64. Magnum Bonum (Sutton).—Growth vigorous; foliage dark green; leaflets large, pointed; flowers white; pods light green, 5–6 inches long, flat; seed white; crop good.

65. Marvel of the Market (Vilmorin).—Growth moderate; foliage dark green; leaflets pointed; flowers scarlet; pods yellow, waxy, 4 inches long, flat; seed black; crop good.

66. Matchless (Vilmorin).—Growth moderate; foliage dark green; leaflets small, pointed; flowers white; pods light green, 4 inches long, rounded; seed white; crop moderate.

67, 68. Monster Negro (Barr, Carter).—Growth very vigorous; foliage dark green; leaflets large, blunt; flowers dark scarlet; pods light green, 5–6 inches long, rounded; seed black; crop good.

69. Mont D'Or (Vilmorin).—Growth moderate; foliage dark green; leaflets small, pointed; flowers dark lilac; pods yellow, waxy, 3 inches long, rounded; seed black and dark brown; crop moderate.

70. Negro Longpod (Carter).—Growth moderate; foliage dark green; leaflets large, blunt; flowers pale scarlet; pods light green, 4 inches long, rounded; seed black; crop moderate.

71, 72. Ne Plus Ultra (J. Veitch, Carter), **A.M.** April 27, 1897, as a forcing variety; **A.M.** July 25, 1899, as a garden variety.—Growth moderate; foliage dark green; leaflets pointed; flowers pale lilac; pods light green, 4 inches long, rounded; seed yellow; crop good.

73, 74, 75. Ne Plus Ultra (selected) (Barr, Massey, Sutton).—Similar to No. 71.

76. Newington Wonder (Carter).—Growth moderate; foliage dark green; leaflets blunt; flowers scarlet; pods dark green, 3–4 inches long, rounded; seed dark dun; crop good.

78, 79. Osborne's Forcing (Carter, J. Veitch), **F.C.C.** August 5, 1873.—Growth moderate; foliage dark green; leaflets small, pointed; flowers pale lilac; pods light green, 4 inches long, rounded; seed dark dun; crop good.

80. Pale Dun (Carter).—Growth vigorous; foliage dark green; leaflets pointed; flowers lilac; pods pale green, 4–5 inches long, rounded; seed pale dun; crop good.

81. Parisian Early (Barr).—Growth vigorous; foliage dark green; leaflets blunt; flowers dark scarlet; pods dark green, blotched with purple, 4–5 inches long, rounded; seed very pale dun; crop good.

82. Perfection (Sutton), **A.M.** July 25, 1899.—Growth moderate; foliage dark green; leaflets small, blunt; flowers lilac; pods light green, 3–4 inches long, rounded; seed pale dun; crop good.

83. Perpetual (Carter).—Growth moderate; foliage dark green; leaflets small, blunt; flowers light lilac; pods light green, 4 inches long, rounded; seed very pale dun; crop good.

84. Plentiful (Sutton).—Growth moderate; foliage pale green; leaflets blunt; flowers light lilac; pods light green, 4 inches long, flattish; seed dirty yellow; crop good.

85. Plump and Tender (Vilmorin).—Growth moderate; foliage dark green; leaflets small, blunt; flowers white; pods light green, 3–4 inches long, rounded; seed pale dun; crop poor.

86. Princess Pearl (Spruyt).—Growth very dwarf; foliage dark green; leaflets small, blunt; flowers yellowish-white; pods dark green, 3 inches long, rounded; seed white, small, round; crop very poor.

87. Prolific Negro (Sutton).—Growth vigorous; inclined to run; foliage dark green; leaflets blunt; flowers light scarlet; pods light green, 4 inches long, rounded; seed black; crop moderate.

88, 89. Progress (J. Veitch, Carter), **A.M.** July 25, 1899.—Growth moderate; foliage dark green; leaflets pointed; flowers light lilac; pods light green, 4 inches long, flat; seed pale dun; crop good.

90. Rifleman (Carter).—Growth vigorous; foliage dark green; leaflets large, blunt; flowers white; pods light green, 6 inches long, flat; seed white; crop good.

91, 92. Reliance (Carter, Sutton), **A.M.** September 1, 1903.—Growth moderate; foliage dark green; leaflets small, pointed; flowers pale lilac; pods light green, 4 inches long, rounded; seed pale dun; crop good.

93. Seedling 248 (Carter).—Seed yellow, very small.

94. Seedling 267 (Carter).—Seed pale greenish-yellow.

95. Seedling 268 (Carter).—Seed purple.

96. Seedling 269 (Carter).—Seed white.

97. Shah of Persia (Vilmorin).—Growth vigorous; foliage dark green; leaflets large, blunt; flowers light scarlet; pods light green, 4–5 inches long, flat; seed black; crop moderate.

98. Sion House (Carter).—Growth very dwarf; foliage dark green; leaflets blunt; flowers pale lilac; pods light green, 4–5 inches long, flat; seed pale dun; crop moderate.

99. Stringless Greenpod (Sydenham).—Growth moderate; foliage dark green; leaflets pointed; flowers light lilac; pods light green, 3 4 inches long, rounded; seed dark dun; crop moderate.

100. Sugar Pearl Perfection (Heinemann).—Growth vigorous, inclined to run; foliage dark green; leaflets small, blunt; flowers white; pods light green, 3–4 inches long, rounded; seed small, white; crop good.

101. Superb Early Forcing (J. Veitch).—Growth very dwarf; foliage dark green; leaflets small, pointed; flowers violet; pods light green; 4 inches long, flat; seed dark dun; crop good.

102. Superlative (Sutton).—Growth vigorous; foliage dark green; leaflets small, pointed; flowers whitish-yellow; pods light green, 4–5 inches long, flat; seed white; crop good.

103. Surrey Prolific (Dobbie), **A.M.** August 13, 1901.—Growth vigorous; foliage dark green; leaflets large, pointed; flowers lilac; pods light green, 5–6 inches long, flattish; seed dark dun; crop heavy.

77. The Belfast (R. Dickson), **XXX** August 12, 1909.—Growth vigorous; foliage dark green; leaflets small, pointed; flowers white; pods light green, 5–6 inches long, rounded; seed white; crop good.

104. Triumph of the Frames (Vilmorin).—Growth vigorous; foliage dark green; leaflets small, pointed; flowers white; pods dark green, 3–4 inches long, rounded; seed pale green; crop good.

105. Unrivalled Dwarf Wax (Vilmorin).—Growth moderately vigorous; foliage dark green; leaflets small, pointed; flowers lilac; pods yellow, waxy, 4 inches long, rounded; seed yellow; crop good.

106. Veitch's Hybrid (J. Veitch).—Growth moderately vigorous; foliage dark green; leaflets small, pointed; flowers lilac; pods dark green, 4 inches long; seed pale dun; crop good.

107. White Advancer (Carter), **F.C.C.** August 5, 1873.—Growth very vigorous; foliage dark green; leaflets large, blunt; flowers white; pods light green, 4–5 inches long, flat; seed white; crop moderate.

108. White Canterbury (Carter).—Growth very vigorous; foliage dark green; leaflets pointed; flowers white; pods light green, 4–5 inches long, flat; seed white; crop good.

109. White Haricot (Sutton).—Growth very vigorous; foliage dark green; leaflets pointed; flowers white; pods light green, 5–6 inches long, flat; seed white; crop good.

110. White Ilsenburg (Carter).—Growth very vigorous; foliage dark green; leaflets small, pointed; flowers white; pods light green, 4–5 inches long, flat; seed white; crop good.

111. Long-podded Dutch Sword (Spruyt).—Growth vigorous, inclined to run; foliage dark green; leaflets blunt; flowers white; pods light green, 4 inches long, flat; seed white; crop poor.

112. White Queen (R. Veitch).—Growth very vigorous; foliage dark green; leaflets blunt; flowers yellowish-white; pods yellow, waxy, 4–5 inches long, flat; seed white; crop good.

113. White Wonder (J. Veitch).—Growth vigorous; foliage dark green; leaflets blunt; flowers white; pods light green, 4–5 inches long, flat; seed white; crop good.

114. Wonder of France (Vilmorin).—Growth vigorous; foliage dark green; leaflets small, blunt; flowers white; pods light green, 4 inches long, flat; seed pale green; crop good.

115. Soya Bean (A. Dean).—Seed pale, round; failed to germinate.

Climbing French Beans.

1. Ordinary (Carter).—Growth medium; leaflets small, pointed; flowers pale lilac; pods light green, 7 inches long, flat, seed purple; crop moderate.

2. Caseknife (Carter).—Growth vigorous; leaflets small, blunt; flowers white; pods light green, 6–7 inches long, flat, seed white; crop moderate.

3. Count Zeppelin (Heinemann), **XXX** September 9, 1909.—Growth very vigorous; foliage dark green; leaflets large, blunt; flowers white; pods light yellow, 11–13 inches long, flat, seed white; crop very heavy.

4. Dark Dun (Carter), **XXX** September 9, 1909.—Growth vigorous; leaflets small; flowers white; pods light green, 6 inches long, slightly rounded; seed dark dun; crop heavy; specially suited for private gardens, but not for market.

5. Earliest of All (Sutton).—Growth medium; leaflets small; flowers white; pods light green, 5 inches long, rounded and curved; seed white; crop moderate.

6. Earliest (Spruyt).—Growth moderate; foliage light; leaflets small; flowers white; pods light green, 8½ inches long, flat, broad, and wrinkled; seed white; crop moderate.

7. Early Stringless (Carter).—Growth moderate; foliage dark green; leaflets small; flowers white; pods light green, 7½ inches long, rounded; seed white; crop good.

8. Epicure (Sutton).—Growth moderate; foliage dark; leaflets small; flowers white; pods light green, 6 inches long, somewhat rounded; seed dark dun; crop moderate.

9. Holborn Masterpiece (Carter).—Growth vigorous; foliage dark; leaflets blunt; flowers white; pods light green, 8 inches long, flat and broad; seed white; crop good.

10. July (Carter).—Growth weak; foliage yellowish; leaflets small; flowers white; pods light green, 4-5 inches long, rounded; seed small, white; crop poor.

11. Mont D'Or (Carter).—Growth moderate; foliage light green; leaflets small, pointed; flowers white; pods yellow, 5 inches long, flat; seed dark purplish-brown; crop moderate.

12. Princess of Wales (Sutton), **XXX** September 9, 1909.—Growth moderate; foliage dark green; leaflets small, pointed; flowers pale lilac; pods light green, 7 inches long, slightly rounded; seed dark dun; crop good.

13. Re-selected (Carter), **XXX** September 9, 1909.—Growth moderate; foliage pale green; leaflets large, blunt; flowers pale lilac; pods medium green, 6 inches long, flat; seed purple; crop good.

14. Successor (Carter).—Growth vigorous; foliage dark; leaflets large, pointed; flowers white; pods light green, 7 inches long, flat, uneven; seed white; crop moderate.

15. Ten Weeks (Carter).—Growth vigorous; foliage dark; leaflets large, blunt; flowers white; pods light green, 7–8 inches long, flat; seed white; crop moderate.

16. Tender and True (Sutton), **F.C.C.** September 3, 1891.—Growth moderate; foliage dark green; leaflets small, pointed; flowers pale lilac; pods light green, 6 inches long, flat; seed purple; crop moderate.

17. White Pearl (Spruyt).—Growth vigorous; foliage dark; leaflets large, blunt; flowers white; pods light green, 7–8 inches long, flat and broad; seed very small, creamy-white; crop good.

18. White Princess (Spruyt).—Growth moderate; foliage dark, leaflets small; flowers white; pods light green, 4 inches long, round; seed white; crop moderate.

19. White Smooth Giant Sword (Spruyt).—Growth moderate; foliage pale green; leaflets blunt; flowers white; pods light green, 4 inches long, rounded; seed large, white, irregular; crop moderate.

RUNNER BEANS.

1. Best of All (Carter), **A.M.** September 1, 1903.—Growth vigorous and strong; foliage dark green; leaflets large; flowers scarlet; pods light green, 6–7 inches long; seed pale purple; crop moderate.

2. Black Nigger (Cook).—Growth weak; foliage pale; leaflets small; flowers scarlet; pods dark green, 7 inches long, rounded; seed black; crop poor.

3. Butterfly (Carter).—Growth moderate; foliage dark; small leaflets; flowers scarlet; pods light green, 6–7 inches long, flat; seed pale dun; crop moderate.

4. Champion (Carter), **A.M.** September 1, 1903.—Growth vigorous; foliage dark green; leaflets large; flowers scarlet; pods light green, 6 inches long, flat; seed pale purple; crop fair.

5. Champion Selected (Carter).—Similar to No. 4.

6. Czar (Carter).—Growth vigorous; foliage dark green; leaflets large; flowers white; pods dark green, 6–7 inches long, flat; seed white; crop good.

7. Elephant (Carter).—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet; pods dark green, 6–7 inches long; seed pale purple; crop moderate.

8. Giant Painted Lady (Carter).—Growth strong and vigorous; dark foliage; leaflets large; flowers scarlet and white; pods light green, 6–7 inches long, flat; seed pale dun; crop moderate.

9. Giant White (Carter).—Growth vigorous and strong; foliage dark; leaflets large; flowers white; pods light green, 6–7 inches long, flat; seed white; crop good.

10. Girtford Giant (Carter).—Growth strong and vigorous; foliage large; leaflets large; flowers scarlet; pods light green, 6–7 inches long, flat; seed pale purple; crop moderate.

11. Hackwood Park Success (Carter), **A.M.** August 18, 1903.—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet; pods light green, 7–8 inches long, rounded; seed pale purple; crop good.

12. Holborn Seedling (Carter).—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet and white; pods light green, 7 inches long, flat; seed white; crop moderate.

13. Ne Plus Ultra (Carter).—Growth moderate; foliage dark; leaflets large; flowers scarlet; pods light green, 6–7 inches long; seed pale purple; crop moderate.

14. Jubilee (Carter).—Growth strong and vigorous; foliage dark; leaflets large; flowers white; pods dark green, 7–8 inches long, flat; seed white; crop good.

15. Prolific (Wesker).—Growth vigorous; foliage mixed; flowers mixed; pods dark green, 8 inches long, flat; seed pale dun; crop good; stock requires more selection.

16. Painted Lady (Carter).—Growth strong and vigorous; foliage dark; leaflets large; flowers scarlet and white; pods light green, 7 inches long, flat; seed pale dun; crop moderate.

17. Prizewinner (Carter), **F.C.C.** September 20, 1892.—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet; pods dark green, 8 inches long, flat; seed pale purple; crop good.

18. Red Giant (Carter), **XXX** September 9, 1909.—Growth strong and vigorous; foliage dark; leaflets large; flowers scarlet; pods pale green, 8–9 inches long, flat; seed pale purple; crop good.

19. Scarlet (Carter).—Growth strong and vigorous; foliage dark; leaflets large; flowers scarlet; pods light green, 6–7 inches long, flat; seed pale purple; crop moderate.

20. Scarlet Emperor (Carter), **XXX** September 9, 1909.—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet; pods light green, 9–10 inches long, flat; seed pale purple; crop heavy.

21. Scarlet Emperor (Spotted Form) (Holmes).—Stock requires more selection; seed black.

22. Titan (Carter).—Growth strong and vigorous; foliage dark green; leaflets large; flowers scarlet; pods light green, 5–6 inches long, flat; seed pale purple; crop moderate.

23. White Emperor (Beckett), **A.M.** September 28, 1909.—Growth strong and vigorous; foliage dark green; leaflets large; flowers white; pods light green, 10–12 inches long, flat; seed white; crop good.

24. White Giant (Spruyt).—Strong, vigorous grower; foliage dark, leaflets large; flowers white; pods light green, 8–10 inches long, flat; seed white; crop good.

CAULIFLOWERS AT WISLEY, 1909.

Sixty-eight stocks of Cauliflower were sent for trial, all of which were sown on April 23, on seed beds, and afterwards planted out in deeply dug and liberally manured ground. Practically all the stocks made first-rate growth, showing their true character. The collection was examined by the Fruit and Vegetable Committee on several occasions.

F.C.C. = First-class Certificate.
A.M. = Award of Merit.

1.* All the Year Round (Nutting).—Early London type; leaves glaucous; sturdy habit, heads large, white, round, firm, growth vigorous.

2, 3, 4. Autumn Mammoth (Barr, Nutting, Sutton).—Autumn Giant type; leaves very glaucous; fairly sturdy habit, heads fairly large, rounded, uneven, firm and white.

5. Best of All (Barr).—Early Snowball type; buttoned and bolted prematurely.

6. Buzelin (Heinemann).—Early London type; leaves rather glaucous; heads medium to large, round, firm, white.

7. Choice (Spruyt).—Autumn Giant type; leaves very glaucous; fairly sturdy habit, heads medium size, fairly round, firm and white.

8. Covent Garden Early London (Barr).—Early London type; leaves green; fairly sturdy habit, heads of medium size, white and rather loose.

9. Conqueror (Vilmorin), **XXX** September 14, 1909.—Early London type; leaves glaucous; very sturdy habit, heads rather large, rounded, white and firm.

10, 11. Danish Giant (Poulsen, J. Veitch).—Early London type; foliage slightly glaucous; sturdy habit, heads large, rounded, white and firm.

12. Danish Giant (Carter).—Similar to No. 10, but stock mixed.

13. Defiance (Carter).—Early London type; foliage green; fairly sturdy habit, heads of medium size, rounded, white and firm.

14. Dwarf Erfurt (Heinemann) **XXX** September 14, 1909.—Early Erfurt type; leaves slightly glaucous; habit dwarf and sturdy, heads medium size, somewhat flat, white and firm.

15. Dwarf Erfurt (Poulsen).—Early Erfurt type; foliage glaucous; rather weak habit, heads medium to rather large, white, firm, and fairly compact.

16. Dwarf Erfurt Mammoth (J. Veitch).—Very similar to No. 14.

17. Dwarf Mammoth (Carter), **XXX** September 14, 1909.—Early Erfurt type; foliage glaucous; fairly sturdy habit, heads large, rather flat, white and firm.

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* See footnote, p. 429.

18. Earliest of All (Cannell), **XXX** September 14, 1909.—Similar to No. 17.

19. Early (Carter).—Early Erfurt type; foliage green, habit sturdy, heads medium to large, flat, white and loose.

20. Early Dwarf Naples (Carter).—Autumn Giant type; foliage very glaucous; habit sturdy, heads fairly large, rounded, pale sulphur, very firm and compact.

21. Early Erfurt (Spruyt).—Similar to No. 14.

22. Early Giant (Sutton).—Autumn Giant type; foliage very glaucous; habit somewhat dwarf and weak, heads rather large, flat, pale sulphur, rather loose.

23. Early London (J. Veitch).—Early London type; foliage somewhat glaucous; habit vigorous, heads large, slightly rounded, white and firm.

24. Early Snowball (Barr), **XXX** September 14, 1909.—Early Snowball type; foliage slightly glaucous; habit dwarf, heads large, round, white and firm.

25, 26. Eclipse (J. Veitch, Dammann) **A.M.** September 11, 1903.—Autumn Giant type; leaves glaucous; habit fairly sturdy, heads medium to large, fairly rounded, white and firm.

27. Eclipse (Carter).—Similar to No. 25, but heads of pale sulphur colour.

28. Enkhuizen Market (Barr).—Early London type; foliage slightly glaucous; habit weak, heads of medium size, rather flat, not very compact.

29. Extra Early Autumn Giant (Carter), **XXX** September 14, 1909.—Autumn Giant type; foliage glaucous; tall erect vigorous habit, head medium size, rounded, white and firm.

30. First Crop (Sutton).—Early Snowball type; foliage slightly glaucous; habit weak, heads large and loose, poor variety.

31. Forerunner (Carter).—Similar to No. 30.

32. Giant Malta (Dammann).—Autumn Giant type; a useless variety; did not button, but hearted like a cabbage.

33. Harbinger (Massey).—Early Snowball type; foliage glaucous; habit weak, heads large and loose; a poor variety.

34. King of Cauliflowers (Barr), **XXX** September 14, 1909.—Early London type; foliage green; habit sturdy, heads medium size, round, white and firm.

35. Lenormand's Extra Large (Vilmorin).—Early London type; foliage glaucous; habit sturdy, heads medium to large, sulphur colour, rather loose; a poor variety.

36. Magnum Bonum (Sutton), **XXX** September 14, 1909.—Early Snowball type; foliage glaucous; habit sturdy, heads large, white and firm.

37. Martinmas Perfection (R. Veitch).—Autumn Giant type; foliage glaucous and very dense; habit sturdy, heads medium size, flat, white, loose and uneven; a poor variety.

38. Midsummer Day (R. Veitch). Early Snowball type; foliage slightly glaucous; habit sturdy, head large, rather flat, fairly white, but not very compact.

39. Mont Blanc (Carter).—Early London type; foliage slightly glaucous; habit sturdy, heads large, rather flat, white and rather loose.

40. New Emperor (Carter).—Early London type; foliage slightly glaucous; habit sturdy, heads large, loose and uneven.

41. Ne Plus Ultra (Nutting).—Autumn Giant type; foliage very glaucous; habit weak, heads large, somewhat flat, pale sulphur, fairly firm.

42. Omega (Carter).—Autumn Giant type; a useless variety, similar to No. 32.

43. Pearl (J. Veitch).—Early London type; foliage slightly glaucous; habit sturdy, heads large, rather flat and loose.

44. Primus (Dammann).—Autumn Giant type; foliage fairly glaucous; habit rather dwarf, heads medium size, rounded, pale sulphur, firm and compact.

45. Purity (Sutton).—Early Snowball type; foliage slightly glaucous; habit rather weak, heads medium to rather large size, rounded, white, not very compact.

46. Reliance (Vilmorin).—Early London type; too poor to describe.

47. Ringleader (Massey).—Early Erfurt type; foliage slightly glaucous; heads of medium size, somewhat flat and not very compact.

48. Silver Crown (Harrison).—Early London type; foliage green; habit sturdy, heads of medium size, rounded, white, firm and compact.

49, 50, 51. Snowball (Vilmorin, J. Veitch, Spruyt).—Early Snowball type; foliage green; habit fairly sturdy, heads of rather large size, white, firm and compact.

52. Universal (Sutton).—Early London type; foliage slightly glaucous; habit fairly strong, heads rather small, flat, sulphur colour, fairly firm.

53. Utrecht (Spruyt).—Early London type; foliage slightly glaucous: habit fairly sturdy, heads rather large, slightly rounded, white, loose and uneven.

54. Victoria (Massey).—Autumn Giant type; foliage glaucous; habit sturdy, heads medium size, rounded, white, very firm and even.

55. Vierlander (Heinemann).—Early London type; foliage slightly glaucous; habit fairly sturdy, heads rather small, somewhat flat, sulphur colour, fairly firm.

56, 59, 60. Veitch's Autumn Giant (Barr, J. Veitch, Dammann), **F.C.C.** November 2, 1870.—Autumn Giant type; foliage very glaucous; habit very sturdy, heads medium size, rounded, white, firm and compact.

57, 58. Veitch's Autumn Giant (R. Veitch, Nutting).—Similar to No. 56, but of pale sulphur colour.

61. Autumn Giant (Vilmorin).—Autumn Giant type; foliage very glaucous; tall, sturdy habit, heads large, somewhat rounded, pale sulphur colour, rather loose and uneven.

62. Autumn Giant Early Stock (J. Veitch).—Autumn Giant type; foliage fairly glaucous; habit sturdy, heads large, flat, pale sulphur colour, loose and uneven.

63. Veitch's Giant (Heinemann).—Autumn Giant type; foliage very glaucous; habit tall and sturdy, heads of medium size, rounded, white, firm and compact.

64. Veitch's Self Protecting (Dammann).—Autumn Giant type; similar to No. 63.

65, 66, 67. Walcheren (J. Veitch, Barr, Carter), **A.M.** October 10, 1905.—Walcheren type; foliage green; fairly sturdy habit, heads medium size, rather flat, pale sulphur colour, slightly loose.

68. White Queen (Sutton).—Walcheren type; foliage green; habit rather weak, heads medium size, slightly rounded, sulphur colour, somewhat loose.

POTATOS AT WISLEY, 1909.

One hundred and two stocks of Potatos were received for trial, and all were planted on April 14. The whole collection made good growth, and the majority of the varieties cropped well, but owing to the cold and very wet season, the crops were not generally heavy, and there was more disease than usual. The ground had been deeply dug and well manured, and no Potatos had been grown on the same ground before. The Fruit and Vegetable Committee examined the collection on two occasions, and by reason of their good appearance, heavy crop, and freedom from disease, ordered the following to be cooked :—

Duchess of York.
Pride of Dumfries.
Mr. R. Vere O'Brien.
Scottish Chief.
Widecombe Intermediate.

List of Varieties.

*1. Jacks No. 1.
2. Byram Early Favourite.
3. Dew's Favourite.
4. Harbinger.
5. Taylor's Old Early.
6. Duke of York.
7. Russet Queen.
8. Sharpe's Victor.
9. Epicure.
10. Vanolia.
11. Sharpe's Express.
12. Gladiator.
13. Glandford.
14. Cantab.
15. Mile Cross Early.
16. Devanha Seedling.
17. Pride of Devon.
18. Westminster.
19. Rutter's Fertility.
20. Boyce's No. 2.
21. Boyce's No. 3.
22. Advancer.
23. Early Favourite.
24. First Crop.
25. Progress.
26. Banbury Cross Early.
27. Morning Star.
28. Widecombe Early.
29. English Beauty.
30. The Colleen.
31. Cheddar Hero.
32. Ideal.
33. Sutton's Seedling.
34. Princess Royal.
35. Waterloo.
36. Preston Gem.
37. Dedham Perfection.
38. Chiswick Favourite.
39. Duke of Cornwall.
40. Lady Llewelyn.
41. Southern Star.
42. Syon House Prolific.
43. Daimler.
44. Leonardslee Favourite.
45. Langworthy.
46. Abundance.
47. Reliance.
48. White City.
49. Stoke's Champion.
50. Lindsey.
51. Sent under number only.
52. „ „ „ „
53. Adam's Wonder.
54. Collinsoni.
55. Mr. Harry Bill.
56. Mr. R. Vere O'Brien.

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* See footnote, p. 429.

57. Mrs. R. Vere O'Brien.
58. Beauty of Crossard.
59. Beauty of Inchiguii.
60. British Queen.
61. Eclipse.
62. Irish Queen.
63. Champion Blue.
64. Dalmeny Beauty.
65. Duchess of Cornwall.
66. Washington.
67. Wellington.
68. Best of All.
69. Massey's Masterpiece.
70. Royal Jubilee.
71. Triumph.
72. Victory.
73. Boyce's No. 1.
74. Walpole Pride.
75. Elmstead Star.
76. Goldfinder.
77. Invicta.
78. Longkeeper.
79. King of the Russets.
80. Monarch.
81. Red Emperor.
82. Royalty.
83. Snowball.
84. Surprise.
85. Prince.
86. Myatt's Incomparable.
87. Devonshire Wonder.
88. British Queen, ordinary crop.
89. British Queen, 2nd crop.
90. British Queen No. 2, ordinary crop.
91. British Queen No. 2, 2nd crop.
92. Table Talk.
93. Widecombe Late.
94. Widecombe Intermediate.
95. Herrod's Seedling.
96. The Admiral.

96B. Pride of Dumfries.

97. The Chapman.

97B. Scottish Chief.

98. Talisman.
99. Edgecote Purple.
100. Josephine Goddard.

Early Varieties.

46. Abundance (Sutton).—White, round, flat; rather large; eyes fairly shallow; crop good; free from disease; haulm tall.

22. Advancer (Carter), **XX** August 12, 1909.—White, flat kidney; size medium to large; eyes shallow; crop moderate; slightly diseased; haulm sturdy.

2. Byram Early Favourite (Taylor).—White, tinged with pink; medium size; eyes pink; light crop; free from disease; haulm very dwarf and compact; dark flowers.

26. Banbury Cross Early (Mold).—White, flattened kidney; large; eyes rather deep; crop fair; slightly diseased; haulm sturdy.

68. Best of All (Massey).—White, flattish-round; size medium; eyes shallow; crop moderate; free from disease; haulm weak.

20. Boyce's No. 2 (Boyce).—White, round; very small; eyes rather deep; crop very poor; diseased; haulm weak.

21. Boyce's No. 3 (Boyce).—White, round; exceedingly small; eyes rather deep; crop very poor; diseased; haulm weak.

14. Cantab (Miller).—White, flat kidney; small to very small; eyes shallow; slightly diseased; haulm weak.

31. Cheddar Hero (Gibson).—White, kidney; small; eyes fairly shallow; crop poor; free from disease; haulm sturdy.

38. Chiswick Favourite (J. Veitch), **F.C.C.** March 30, 1886.—White, very irregular; size medium to large; eyes shallow; crop poor; free from disease; haulm sturdy.

37. Dedham Perfection (T. J. Brown).—White, flattened kidney; size medium; eyes shallow; crop poor; slightly diseased; haulm fairly sturdy.

16. Devanha Seedling (R. Veitch), **A.M.** September 29, 1908.—White, round, somewhat irregular; size medium to large; eyes rather deep; moderate crop; free from disease.

3. Dew's Favourite (Dew).—White, round, very irregular; medium size; eyes shallow; moderate crop; slightly diseased; haulm weak.

9. Epicure (Holmes), **A.M.** August 15, 1905.—White, irregular, round; small; eyes rather shallow; poor crop; slightly diseased; haulm sturdy.

29. English Beauty (J. Veitch).—No crop.

23. Early Favourite (Carter).—White, round; size medium; eyes rather deep; crop poor; diseased; haulm weak.

24. First Crop (Carter), **XX** August 12, 1909.—White, irregular, flat, round; size medium to large; eyes shallow; crop moderate; slightly diseased; haulm fairly sturdy.

12. Gladiator (Sutton).—White, long, flat kidney; fairly large; eyes shallow; good even crop; slightly diseased; haulm rather weak.

13. Glandford (Booth).—White, round, flat; size medium to large; eyes shallow; moderate crop; slightly diseased; haulm weak.

4. Harbinger (Holmes), **A.M.** August 5, 1897.—White, round; eyes very shallow; crop poor; free from disease; haulm short and stout.

32. Ideal (Sutton), **A.M.** August 15, 1905.—White, flattened kidney; size medium to rather large; eyes shallow; crop fair; free from disease; haulm sturdy.

1. Jacks No. 1 (Wilson).—White, flat kidney; size medium; eyes shallow; moderate crop; free from disease; haulm short and sturdy.

40. Lady Llewelyn (J. Veitch).—White, round kidney; rather small; eye rather shallow; crop poor, free from disease; haulm rather weak.

50. Lindsey (Booth).—Too poor to describe.

15. Mile Cross Early (Dickson).—White, flat kidney; size medium to large; eye shallow; fair crop; slightly diseased; haulm fairly strong.

27. Morning Star (Notcutt), **XX** August 19, 1909.—Red, flat kidney; eyes fairly shallow; size medium; crop fair; free from disease; haulm sturdy.

17. Pride of Devon (R. Veitch).—White, flat kidney; medium size; eyes shallow; fair crop, free from disease; haulm sturdy.

25. Progress (Paton).—White, rather irregular flat kidney; large; eyes rather shallow; crop good; slightly diseased; haulm sturdy.

36. Preston Gem (Gullick).—White, flattened kidney; large; eyes shallow; crop moderate; rather badly diseased; haulm sturdy.

7. Russet Queen (Holmes), **A.M.** October 23, 1906.—White, round; rather large; eyes very shallow; fair crop; diseased; haulm rather weak.

19. Rutter's Fertility (Rutter).—White, flattened kidney; size medium; eyes shallow; crop moderate; diseased; haulm weak.

47. Reliance (Sutton).—White, flattened kidney; size medium; eyes shallow; crop moderate; free from disease; haulm fairly sturdy.

8. Sharpe's Victor (Holmes), **A.M.** April 25, 1893.—White, flattened, kidney; rather large; eyes shallow; moderate crop; free from disease

11. Sharpe's Express (J. Veitch).—An early kidney, of the Ashleaf type; small; eyes shallow; free from disease; haulm weak.

33. Sutton's Seedling (Sutton).—White, round; small; eyes fairly shallow; crop poor; slightly diseased; haulm sturdy.

41. Southern Star (J. Veitch).—White, irregular, flat, round; large; eyes shallow; crop moderate; slightly diseased; haulm sturdy.

42. Syon House Prolific (J. Veitch), F.C.C. April 11, 1905.—White, flat, round; small; eyes shallow; crop poor, diseased; haulm rather weak.

49. Stoke's Champion (S. and J. Brown).—White, rather flat kidney; size medium; eyes shallow; crop moderate; free from disease; haulm weak.

5. Taylor's Old Early (Holmes).—Red, irregular, round; medium to very small; eyes rather deep; very moderate crop; slightly diseased.

30. The Colleen (J. Veitch), **A.M.** August 8, 1907.—White, flattened, kidney; large; eyes shallow; crop moderate; slightly diseased; haulm sturdy.

10. Vanolia (Cannell).—White, irregular, kidney; large; eyes fairly shallow; moderate crop; diseased slightly; haulm sturdy.

18. Westminster (Wakerley).—White, very irregular; large; eyes fairly shallow; poor crop; diseased; haulm fairly strong; a useless variety.

28. Widecombe Early (Pickering).—White, flattened kidney; large; eyes shallow; crop moderate; free from disease; haulm sturdy.

65. Waterloo (Wakerley).—Russety red, flat, round; eyes deep; large; crop moderate; slightly diseased; haulm sturdy.

66. Washington (Wakerley).—Too poor to describe.

67. Wellington (Wakerley).—White, round; small; eyes shallow; crop very poor; slightly diseased; haulm weak.

Mid-season and Late Varieties.*

53. Adam's Wonder (Gibson).—White, flat, kidney; size medium to large; eyes shallow; crop fair; rather badly diseased; haulm weak.

58. Beauty of Crossard (Collins).—White, irregular, flattened, kidney; size medium to large; eyes shallow; crop poor; badly diseased; haulm weak.

59. Beauty of Inchigeel (Collins).—White, irregular, round; size medium; eyes deep; crop poor; badly diseased; haulm weak.

73. Boyce's No. 1 (Boyce).—White, round, flat; small; eyes rather deep; crop poor; badly diseased; haulm weak.

60. British Queen No. 2 (Dickson).—Too poor to describe.

88. British Queen, ordinary crop (Sands), **A.M.** August 15, 1906.—White, round, many inclined to kidney shape; size medium; eyes fairly shallow; crop moderate; very slightly diseased; haulm moderate.

89. British Queen, 2nd crop (Sands).—Similar to 88.

90. British Queen No. 2, ordinary crop (Sands).—Similar to 88.

91. British Queen No. 2, 2nd crop (Sands).—White, round, flat; eyes rather deep; size medium to large; crop poor; somewhat diseased; haulm tall and weak.

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* Late varieties unless otherwise stated.

63. Champion Blue (Dickson).—Red ; too poor to describe.

54. Collinsoni (Collins).—White, flat, kidney ; size medium to large ; eyes deep ; crop fair ; diseased ; haulm rather weak.

43. Daimler (Cook).—White, flat, kidney ; size medium to large ; eyes shallow ; crop poor ; slightly diseased ; haulm dwarf and compact.

64. Dalmeny Beauty (R. Veitch), **A.M.** September 11, 1903.—White, flattened kidney ; size medium ; eyes shallow ; crop moderate ; badly diseased ; haulm tall and weak.

87. Devonshire Wonder (Wilders).—Red, flattened kidney ; rather large ; eyes rather deep ; crop good ; very slightly diseased ; haulm rather weak.

65. Duchess of Cornwall (R. Veitch), **A.M.** October 24, 1905.—White, flat, round ; size medium to large ; eyes full ; crop fair ; some disease ; haulm tall and strong.

6. Duke of York (Holmes), **XXX** September 9, 1909.—White, rather flat, kidney ; large ; eyes rather deep ; good even crop ; haulm tall and sturdy.

39. Duke of Cornwall (J. Veitch).—White, irregular, flat kidney ; size medium ; eyes fairly shallow ; crop poor ; rather badly diseased ; haulm compact.

61. Eclipse (Dickson).—White, flattened kidney ; rather large ; eyes fairly shallow ; crop moderate ; badly diseased ; haulm tall and straggly.

99. Edgecote Purple (Notcutt).—Red, flat, kidney ; small ; eyes fairly shallow ; crop poor ; badly diseased ; haulm weak.

75. Elmstead Star (T. J. W. Brown).—White, very irregular, flat, kidney ; large ; eyes deep ; crop poor ; much diseased ; haulm weak.

76. Goldfinder (Carter).—White, flat, kidney ; size medium ; eyes shallow ; crop very fair ; slightly diseased ; haulm tall but weak.

95. Herrod's Seedling (Herrod).—White, flat, kidney ; size medium to small ; eyes fairly shallow ; crop poor ; somewhat diseased ; haulm weak.

77. Invicta (Carter).—Red, flat, round ; size medium ; eyes deep ; crop poor ; diseased ; haulm weak.

62. Irish Queen (Dickson).—White, tinged with pink, flattish, round ; size medium to rather large ; eyes deep pink ; crop rather poor ; slightly diseased ; haulm tall and weak.

100. Josephine Goddard (Barr).—Pink, round, flat ; size medium ; eyes pink and rather deep ; crop very poor ; badly diseased ; haulm very weak.

79. King of the Russets (Carter), **F.C.C.** March 30, 1886.—White, tinged with pink ; size medium to small ; eyes rather deep, tinged pink ; crop moderate ; some disease ; haulm tall and sturdy.

45. Langworthy (Holmes),—White, flattened, kidney ; size medium ; eyes shallow ; crop poor ; diseased ; haulm tall and sturdy.

44. Leonardslee Favourite (Cook).—White, flat, round ; size medium to rather large ; eyes fairly shallow ; crop poor ; diseased ; haulm dwarf and weak.

78. Longkeeper (Carter), **A.M.** October 15, 1907.—White, flat, kidney ; fairly large ; eyes fairly shallow : crop rather poor ; some disease : haulm rather weak.

69. Massey's Masterpiece (Massey).—White, flat, round ; size medium ; eyes fairly shallow ; crop poor ; slightly diseased ; haulm dwarf and weak.

55. Mr. Harry Bill (Collins).—Red, flattened, round ; small ; eyes deep ; crop poor ; slightly diseased ; haulm rather weak.

56. Mr. R. Vere O'Brien (Collins), **XXX** September 9, 1909.—White, flattened kidney ; eyes shallow ; size rather large ; crop even and good ; very slightly diseased ; haulm tall and straggly.

57. Mrs. R. Vere O'Brien (Collins).—Very irregular ; badly diseased ; too poor to describe ; very weak haulm.

80. Monarch (Carter).—White, flat, round ; very small ; eyes shallow ; crop very poor ; rather badly diseased ; haulm weak.

86. Myatt's Incomparable (Mitchell).—White, round ; very small ; eyes deep ; crop very poor ; slightly diseased ; haulm rather weak.

96B. Pride of Dumfries (Barr), **XXX** September 9, 1909.—White, slightly flattened, round ; size medium to rather large ; eyes fairly shallow ; crop good ; very slightly diseased ; haulm tall and sturdy.

85. Prince (Paton).—White, round, flat ; size medium to small ; eyes rather deep ; crop very poor ; rather badly diseased ; haulm weak.

34. Princess Royal (Mackie).—White, irregular kidney ; size medium to large ; eyes shallow ; crop medium ; diseased ; haulm fairly sturdy.

81. Red Emperor (Carter).—Red, irregular, large, flat, kidney ; size medium to rather large ; eyes rather deep ; moderate crop ; slightly diseased ; haulm tall and fairly sturdy.

70. Royal Jubilee (Massey).—White, blunt, kidney ; large ; eyes fairly shallow ; crop fair ; rather badly diseased ; haulm tall and sturdy.

82. Royalty (Carter).—White, flat, round, rather irregular ; size medium ; eyes deep ; crop rather poor ; badly diseased ; haulm tall and weak.

97B. Scottish Chief (Barr).—White, flattened, round ; size medium ; eyes fairly shallow ; crop good ; rather badly diseased ; haulm tall.

83. Snowball (Carter).—White, round ; rather small ; eyes rather deep ; crop poor ; rather badly diseased ; haulm tall and rather weak.

84. Surprise (Carter).—White, round, kidney ; size medium to small ; eyes fairly shallow ; crop poor ; badly diseased ; haulm weak.

92. Table Talk (Sands).—White, flat, round ; rather large ; eyes deep ; crop fair ; rather badly diseased ; haulm tall and weak.

98. Talisman (Dobbie).—White, flat, kidney ; size medium to large ; eyes rather deep ; crop poor ; rather badly diseased ; haulm rather weak.

96. The Admiral (Dobbie).—White, flat, round ; size medium ; eyes fairly shallow ; crop moderate ; slightly diseased ; haulm tall and sturdy.

97. The Chapman (Dobbie).—White, round, flat ; size medium to rather large ; eyes rather deep ; crop fair ; slightly diseased ; haulm tall and straggling.

71. Triumph (Massey), **F.C.C.** September 12, 1893.—White, irregular, flat, round ; size medium ; eyes deep ; crop very poor ; much diseased ; haulm weak.

72. Victory (Massey).—Too poor to describe.

74. Walpole Pride (Miller).—White, long, flat, blunt kidney ; very large ; eyes rather deep ; crop medium ; badly diseased ; haulm weak.

48. White City (Sutton).—White; crop very poor; very badly diseased; haulm tall.

93. Widecombe Late (Pickering).—White, flat kidney; rather large; eyes shallow; crop poor; somewhat diseased; haulm rather weak.

94. Widecombe Intermediate (Pickering), **XXX** September 9, 1909.—White, round, flat; size medium to rather large; eyes fairly shallow; crop good; very slightly diseased; haulm tall and sturdy. (Mid-season.)

51. (Sinclair).—Sent under number only.

52. (Sinclair).—Sent under number only.

POTATO 'THE FACTOR.'

Tubers of the Potato 'Factor' were obtained from nine different sources, and twenty tubers of each were planted. The following table shows the crop obtained:—

Trial No.	Donor	Address	Soil where seed was grown	Ware	Seed	Diseased	Small	Total Weight
				lb.	lb.	lb.	lb.	lb.
1	Messrs. Hobbies.	Dereham, Norfolk.	—	44	11½	8½	10½	74½
2	" Dobbie.	Rothesay.	Dunbar red soil.	49	13½	11½	7½	81½
3	" Dobbie.	Rothesay.	Bute heavy land.	44	15½	6½	8½	74½
4	" Dobbie.	Rothesay.	Bute sandy land.	43	16½	9½	10	79
5	" Dobbie.	Essex.	Essex loam on clay.	49	14½	11½	5½	80½
6	" Holmes.	Tain, Ross.	—	68½	12½	13½	7½	102
7	" R. Veitch.	Exeter.	—	39	10½	6½	9½	65½
8	" Dickson.	Belfast.	—	52½	13½	22½	9½	98
9	" Cocker.	Aberdeen.	—	56½	7½	21½	4½	90
			Average	49½	13	12½	8	83

TOMATOS AT WISLEY, 1909.

THIRTEEN varieties of Tomatos were sent to the gardens to be tested, although there was not intended to be a trial of these in 1909. All were sown in the middle of March and grown in a span-roofed house, trained up the roof. All made splendid growth, and most of the varieties cropped heavily, but none showed any advance on those already in commerce.

1. Sunrise (Carter), **F.C.C.** July 4, 1905, and confirmed October 8, 1907.—Fruit of medium size, deep round, smooth, bright red; very free setter; foliage and habit robust; very heavy cropper.

2. Barnett's Supreme (Barnett).—Fruit medium to large, deep round, smooth, bright red; free setter; habit and foliage robust; good cropper.

3. Coreless (Carter).—Fruit of large size, rather flat round, slightly corrugated, bright red, rather poor setter; habit robust; foliage unhealthy; poor crop.

4. Dundonald Seedling (F. E. Smith).—Fruit rather large, deep round, slightly corrugated, bright red, free setter; foliage and habit robust; good crop.

5. Miss Paul (F. F. Paul).—Fruit of medium to rather large size, slightly flat round, very slightly corrugated; free setter; foliage and habit robust; good crop; bright red; the first to ripen.

6. Harrison's Fillbasket (Harrison).—Fruit of medium size, rather flat, round, very slightly corrugated, bright red; very free setter; foliage and habit robust; good crop.

7. Cannell's Invicta (Cannell).—Fruit of medium size, deep round, very slightly corrugated, bright red; very free setter; foliage and habit robust; a heavy cropper.

8. Dwarf Champion (R. Veitch).—Fruit rather large, flat round, very slightly corrugated, red; free setter; dwarf sturdy habit; fair crop.

9. Ornamental Tomato, 'Red Cherry' (Barr).—Fruit small, blunt pear shape, smooth, bright red; free setter; foliage and habit good; fair crop.

10. Ornamental Tomato, 'Yellow Cherry' (Barr), **A.M.** August 15, 1905.—Fruit very small, cherry-shaped, smooth, dark yellow; fairly free setter; foliage and habit robust; crop fair.

11. Ornamental Tomato, 'Red Currant' (Barr), **A.M.** August 23, 1898. Fruit very small, round, smooth, bright red; free setter; very large trusses; habit and foliage rather weak.

12. Ornamental Tomato, 'Yellow Pear' (Barr).—Fruit small, distinctly pear shaped, yellow; poor setter; habit and foliage vigorous.

13. Ornamental Tomato, 'Red Cherry' (Barr).—Fruit small, slightly flat round, smooth, bright red; free setter; habit robust; fair crop.

MISCELLANEOUS VEGETABLES AT WISLEY, 1909.

PEAS.

1. Clipper (Harrison).—Tall, vigorous; height nearly 6 feet; marrowfat type; pods usually single; 6–8 large peas in pod; haulm strong and green.

2. Duke of Portland (Harrison).—Very tall grower; height nearly 7 feet; marrowfat type; pods single; 4–6 peas in each pod; haulm fairly strong.

3. Gardener's Abundance (Spruyt).—Tall, strong grower; pods close to ground, in pairs, pale and edible; 6–8 peas in each; prolific bearer.

4. Green Seedling (Holmes).—Not worth describing.

5. Langley Champion (Cannell).—Height about 6 feet; pods usually in pairs, but did not swell.

6. Lord Leicester (Harrison), **XXX** August 17, 1909.—Moderate grower; height about 4 feet; marrowfat type; pods usually in pairs; 7–8 large peas in each; haulm very dark; withstands mildew.

7. Mayor of Leicester (Harrison), **XXX** August 17, 1909.—Strong, vigorous grower; height about 4 feet; pods in pairs; 9–10 peas in each; beautiful colour.

8. Mendel No. 1 (Holmes).—Tall, vigorous grower; height 6 feet; pods single; 6–8 peas in each; haulm medium.

9. Mendel No. 2 (Holmes).—Similar to No. 8 in all respects.

10. Mendel No. 3 (Holmes).—Very similar to No. 8, but pods much smaller.

11. Polebrooke Surprise (Pawsey).—Moderate growth; height 3 feet 6 inches to 4 feet; heavy cropper; marrowfat type; pods small; 6–7 peas in each; usually in pairs; haulm dark green.

12. P. C. Palmer (Cannell).—Moderate grower; height 4 feet; foliage peculiarly variegated; pods usually in pairs, but failed to fill properly.

13. Rearguard (Hurst).—Tall, vigorous grower; height 5 feet; marrowfat type; pods usually in pairs, very slow to fill.

14. Utility (Harrison).—Moderate grower; height 3 feet 6 inches; marrowfat type; stock requires more selection.

15. White Seedling (Holmes).—A round-seeded variety which proved useless.

16. Unnamed Seedling (Gentle).—Full, vigorous grower; height 6 feet; marrowfat type; pods single; 6-8 peas in each; haulm very pale.

17. Mrs. McKeddie (McKeddie).—Vigorous grower; height 6 feet; pods in pairs; from 6–8 white peas in each; haulm very pale.

MELONS.

1. Barnett Hill Favourite (Mitchelson), **A.M.** July 27, 1909.—See report of Fruit Committee July 27, 1909, p. cxxix.

2. Seedling Melon (Cook).—Fruit large, averaging 4½ lb., each plant bearing 4 fruits; skin pale yellow; flesh white, melting; flavour poor.

3. Queen of the West (R. Veitch).—Fruit large, oval; averaging 4 fruits to a plant, 5 lb. each; skin pale yellow, heavily netted; flesh white; a melon of handsome appearance.

4. Seedling No 1. (Barr).—Fruit large, resembling Canteloupe; skin spotted; flesh yellow and stringy, with very small seed core, very coarsely netted; plants of vigorous growth.

5. Seedling No. 2 (Barr).—Resembling No. 4, but slightly deeper in colour of flesh.

6. Seedling No. 3 (Barr).—Very similar to No. 4, but more coarsely netted; fruits not quite so large; giving off a strong aroma.

7. Maudslie Castle (Barr).—Seed very mixed.

8. The Queen (Barr).—Small spotted fruit with yellow flesh. Fruits all decayed before ripening.

9. Hardy Melon (Barr).—These germinated well; and were planted in a cold frame, but, owing to the lack of sunshine, did not grow well.

KALE.

Long Standing Kale (Laver).—Report will follow later.

CABBAGE.

1. Blood Red (R. Veitch).—Red; outer leaves large and spreading; heads of medium size, almost globular, firm; inner leaves loosely folding; core very large indeed.

2. Brunswick Flat (Spruyt).—Green; outer leaves fairly large and spreading; large drumhead type; soft inner leaves, very loosely folding; flavour slightly bitter; core medium.

3. Early Kent (Harrison).—Green; outer leaves fairly small and compact; heads medium to large; Enfield Market type; firm, inner leaves, very tightly folding; flavour sweet; core small.

4. Improved (Spruyt's Violet Bordered) (Spruyt).—Green, tinged with red; outer leaves large and spreading; heads medium size; globular, firm, inner leaves fairly tightly folding; flavour sweet; core rather large.

5. Little Wonder (Harrison).—Green; outer leaves small and compact; heads medium size; Nonpareil type; firm inner leaves tightly folded; flavour sweet; core small.

6. Model (Harrison).—Green; outer leaves fairly compact; heads very large; Drumhead type; soft inner leaves; rather loosely folding; flavour sweet; core small.

7. Stand By (R. Veitch).—Green; outer leaves fairly compact; heads very large; Drumhead type; soft, inner leaves very loosely folding; flavour sweet; core medium size.

8. Red Utrecht (Spruyt).—Red; outer leaves spreading; heads rather small, globular, very firm; inner leaves tightly folding; core rather large.

9. Utrecht Early Dwarf (Spruyt).—Green; outer leaves spreading; heads large, almost globular, fairly firm; inner leaves loosely folding; flavour sweet; core medium size.

10. Utrecht Large Savoy (Spruyt).—Green; fairly compact habit; heads medium size, firm; Drumhead type.

BRUSSELS SPROUTS.

Reliance (Massey).—Compact medium growing variety; buttons of medium size, close and firm.

CARROTS.

Several varieties were sent in, but did badly, owing to attacks of fly.

TURNIP.

Early Market (Harrison).—A fine turnip of the Early Snowball type, of excellent flavour.

SCORZONERA.

Russian Giant Improved (Spruyt).—A good type of this vegetable.

BROAD BEANS.

1. Early Mazagan (Spruyt).—Dwarf; prolific bearer; pods small, usually in clusters of three; bean dark green.

2. John Harrison (Harrison).—Strong grower; good bearer, pods well filled, 6–8 beans in each; very light colour.

3. Robinhood Green Long Pod (Harrison).—Strong grower; good bearer, pods long, well filled, 6–8 beans in pod; dark green colour.

4. Warriston Wonder (Bell & Bieberstedt).—Strong vigorous grower; good bearer, 8–9 beans in pod; colour almost white.

BEET.

1. Long Smooth Dark Red (Dark Leaved) (Spruyt).—Stock very mixed; growth uneven; requires more selection.

2. Long Smooth Dark Red (Green Leaved) (Spruyt).—Roots long, tapering; colour good; stock even and true.

3. Victoria Beet (Harrison).—A nice beet of good colour; stock even and true.

SORREL.

Broad Leaved (Spruyt).—Did well, but no marked improvement on the ordinary forms.

SPINACH.

1. Large Victoria (Spruyt).—A particularly fine strain of broad-leaved Victoria spinach; exceptionally large leaves; flavour excellent.

2. Broad Leaved Long Standing (Spruyt).—Has been sown to stand the winter.

3. Winter Utrecht (Spruyt).—Has been sown to stand the winter.

PARSNIPS.

1. Capstan (Harrison).—A very good variety of the Intermediate type.
2. Magnum Bonum (Harrison).—A very good parsnip of the Hollow Crown type.

CELERY.

1. Turnip-Rooted (Choice Strain) (Spruyt).—A very good variety of the turnip-rooted celery. Withstands frost fairly well.
2. Giant Prague (Spruyt).—A very good variety of the turnip-rooted celery. Withstands frost fairly well.

ONION.

1. Golden Globe (Harrison).—Size medium; globular to coco-nut shaped; pale straw colour; crop even and good.
2. Up-to-Date (Harrison).—Size medium to large; oval; outer skin straw-coloured; a good crop of even bulbs.

VEGETABLE MARROW.

Hardy Long (Barr).—Not a success.

CUCUMBER.

1. Codsall King (Bakers).—A prolific bearer, strong grower, but unless used as soon as cut becomes bitter.
2. Ridge Cucumber, Baker's Triumph (R. Veitch).—An excellent variety for pickling purposes; prolific bearer, strong vigorous grower.

REPORT ON APPLIANCES, &c., 1909.

1. Extract of Quassia (J. Veitch).—An excellent insecticide when used according to instructions, killing aphis, thrips, &c. Is particularly good for black fly on cherries.

2. Grape Storing Bottle (Wood).—A good bottle for storing grapes, easily filled from the top without removing the bunch.

3. Veriquic Planter (Veriquic Planter Co.).—A useful tool for planting potatos, as there is no undue firming of the soil under the sets, as with the old-fashioned "dibber."

4. Garden Frame (Storrie & Storrie).—This is an excellent span-roof frame, with adjustable lights, which are fixed open by a hand screw as air is required. Another advantage is that the lights can be fixed open for watering purposes. We have found cyclamen, primulas, &c., do particularly well in this frame.

5. Quassop (Marshall).—Tried, and found excellent against red spider.

6. Alpha Sprayer (Alpha Extinguisher).—We consider this to be one of the finest sprayers on the market; it is easily filled with air under pressure by a foot-pump, in precisely the same manner as a bicycle tyre is inflated, and the pressure produces a very fine mist-like spray, which can be regulated by a tap on the top, which shuts off the spray when desired. The nozzle can be reversed at will, which is a great advantage, as the spray may then be directed into the tops of the plants.

7. Improved Watering Can (J. Haws).—This is certainly one of the best watering-cans for horticultural purposes. It is fitted with a small metal strainer on the inside, at the entrance to the spout, so that there is no possibility of the spout becoming blocked.

8. No. 5 Abol Syringe, with bend (E. A. White).—This is one of the best syringes on the market for small plants and seedlings, which require careful syringeing and spraying: and, having the bend, one is able to get amongst specimen plants, and damp and syringe the under sides of the leaves. It is also fitted with a drip preventer, which makes it much nicer to use, and completely does away with the water running back.

9. China Raffia (J. H. Osborne).—A very useful tying material.

10. Abol Magnifying Glass (E. A. White).—A useful little magnifying glass for the pocket.

11. Higginson's Spraying Syringe (Micrometrical Engineering Co.).—A very useful spraying syringe, but no better than several already in use.

12. Grease Proof Bands (Voss).—A very useful band, easily fixed.

13. Banding Grease (Voss).—Dries too quickly to be valuable.

14. Cyanamide (North-Western Cyanamide Co.).—We have tried this, and find it a most excellent manure for Brassicas, &c., if the ground receives a good dressing about three weeks before planting.

15. Barnacle's Patent Plant Stand (Barnacle).—No garden is complete without one of these. The stand is fitted with a small can for holding

insecticides, &c.; it is made of strong iron, with a round top for taking the plant, and this is on a very strong screw, which is invaluable when arranging groups, as large plants can be raised or lowered with a few turns of the screw; the screw enables staking, sponging, and tying specimen plants to be done more readily, as they can be turned round into any position convenient to the one staking.

16. Abol W.S. Insecticide (E. A. White).—We found this, when used according to directions, to be deadly for black fly on cherries, and the leaf-curling aphis on apples.

17. Insecticide (Atlas Lubricating Co.).—An excellent insecticide for killing thrips, mealy bug, and red spider, if used according to directions.

WISLEY SCHOOL OF HORTICULTURE.

NINE students, having completed the two years' course of instruction, sat for the Diploma Examinations on June 30 (written papers) and July 1 (practical papers), Mr. John Fraser, F.L.S., acting as external co-examiner. Eight candidates satisfied the requirements of the examiners and fulfilled the other conditions as set forth in the regulations of the school, and were awarded the Diploma of the Society.

Seventeen students entered for the General Examination of the Society (Senior division) and were all successful. Mr. J. W. McCaig taking the first place.

The prizes and certificates were distributed to the successful candidates on Wednesday, October 6, 1909, by Mr. H. J. Veitch, F.L.S., V.M.H., there being also present Mr. W. Marshall, V.M.H., and Mr. J. Hudson, V.M.H., representing the Council, the Rev. W. Wilks, M.A., Secretary of the Society, and the Right Hon. Arthur H. Dyke Acland, P.C., M.A.

Mr. Hudson congratulated the students on the successes of the past year, and the pronounced advance in their work manifested by their examination papers. He commented upon the need for cultivating legible handwriting despite the demands of other work and study, and the possibly adverse influence of the rough labour of the garden, and emphasized the need of attention to the smallest details and neatness in all garden work, of original thinking, and of courteous deportment, finally pointing out the power of a definite aim and the inspiration of an ideal in the shaping of the future, which lay before everyone.

The Right Hon. Arthur H. Dyke Acland, P.C., being invited by the Chairman to speak, said: "I came down to Wisley to see the beautiful garden of the Royal Horticultural Society, but little knew that work of an educational nature was going on here, nor that I should be asked to speak at such a gathering as this. I have been closely connected with education during the greater part of my life, have attended many prize distributions, and am delighted to find such an Institution as this, which at once commands sympathy and admiration, in the Society's gardens.

"I think that all amateur gardeners who really care at all about gardening feel that ours is one of the best and most useful of the public societies in this country. No place is better calculated for the cultivation of fine taste than a garden. It confers blessing on all, rich or poor, and a great debt is owing to horticulturists who have done so much in collecting species and raising endless varieties. I know of no other pleasure so useful as, or equal to that of gardening, but knowledge is essential. Not only is there the æsthetic side, but gardening has become a very popular industry and must do good wherever it spreads. The enormous developments made in our lifetime are bound to increase the pleasures of the work, and these are mainly due to the labour of gardeners, and to men who have spent years and years upon botanical subjects, and who have met many failures in order to produce here and there a success.

"For my own part I have been interested in gardening ever since I was a boy. My grandfather was deeply interested in horticulture before me. Mr. Veitch's great-grandfather gave my grandfather many of his earliest lessons. My Conifers came from him over half a century ago; so did my fruit trees, and I very well remember in particular my grandfather showing me with great pride his first little Wellingtonia.

"You young men are entering upon your course of horticultural education on that solid basis which the Royal Horticultural Society here affords, where science is combined with practice; and under the Society's supervision it is seen that you start aright. You cannot measure your privileges so well as my friends here on the platform can do, as in their early days no such facilities were offered as those you freely enjoy. And equally as I look back at my own education, I think the new generation can never really know the enormous steps forward made in all parts of the British Isles. In preparing to become gardeners, do not forget the qualities of patience and hard work, endeavouring ever to follow the examples of the men who have gone forward to success before you."

The following is a list of the Awards:—

Diploma Examination (in order of merit): *

Mr. A. W. Simmonds (Diploma and demonstratorship of £40 for one year); Mr. W. G. Kent (Diploma and prize); Mr. J. Ridley (Diploma and prize); Mr. H. W. Abbiss (Diploma and prize); Mr. G. A. S. Brooks (Diploma); Mr. S. B. Gorringe (Diploma); Mr. H. L. Robson (Diploma); Mr. N. A. Phillips (Diploma).

"Nicholson Prize" for observations on the Natural Flora and Fauna of Wisley and its neighbourhood: †

Mr. A. W. Simmonds.

General Examination: ‡

Mr. J. W. McCaig (Scholarship of £25 per annum for two years, Silver-gilt medal, certificate and prize); Mr. W. Miles (certificate and prize); Mr. W. G. Kent (certificate and prize); Mr. H. L. Robson (certificate and prize); Mr. A. W. Simmonds (certificate and prize); and certificates to twelve others.

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* Prizes provided by the income of the "Sutton Prize Fund."

† Prizes provided by the income of the "Nicholson Memorial Fund."

‡ Prizes offered by Mr. James Hudson, V.M.H. (for 1909), in commemoration of the fact that he passed the Society's Examination forty years ago, taking the first place in 1869.

DONORS OF SEEDS, PLANTS, TREES &c., TO THE SOCIETY'S LABORATORY AND GARDEN AT WISLEY DURING THE YEAR 1909.

ALDERSEY, H., Chester. Border carnation 'Noni.' Planted in the trial.

ALPHA EXTINGUISHER Co., Ross. Alpha sprayer. See p. 502.

ANDREWS, W., Truro. Erica sp. Planted on the Rockery.

ANSON, Mrs. C., Ripley. Seeds, &c., of botanical interest.

ARMITAGE, Miss E., Dadnor, Ross. *Viola sylvestris alba.* Planted in the Garden.

ATKIN, J., Beckenham. Strawberry 'Continuity.' Added to collection.

ATLAS LUBRICATING Co., Liverpool. Insecticide. See p. 503.

BACKHOUSE, J., York. *Colchicum speciosum album.* Planted in the Garden.

BAKER, F. J., Meopham. Parsnip seed.

BAKERS, Messrs., Codsall. Cucumber 'Codsall-King' (see p. 501); dahlias (see p. 429).

BARBIER, Messrs., Orleans. Collection of Wichuraiana roses. Planted in the Garden.

BARNETT, W., Swindon. Tomato 'Barnett's Supreme.' See p. 497.

BARR, Messrs., Covent Garden. Melons (see p. 499); collections of seeds (plants raised). Beans (see p. 476); cauliflowers (see p. 486); lettuce (see p. 266); annuals; leeks; potatos (see p. 490).

BARTHOLOMEW, A. C., Reading. Collection of seeds. Plants raised for distribution, etc.

BARTLETT, A. C., Washaway, Cornwall. *Gunnera* sp., *Abies Webbiana*, *Larix Griffithii*, *Cryptomeria japonica.* Growing on.

BASHFORD, Messrs., Jersey. French bean 'Jersey Wonder.' For trial in 1910.

BAXTER, W., Woking. Cactus dahlias. Added to the collection.

BEDFORD, F., Co. Kildare. Eyes of vine, 'Mill Hill Hamburgh.' Growing on.

BELL & BIEBERSTEDT, Messrs., Leith. Broad bean, 'Warriston Wonder Longpod.' See p. 500.

BONNEY, F., Rugeley. Seed of *Veronica parviflora angustifolia.* Plants raised for distribution.

BOOTH, W., Howsham, Lincoln. Potatos. See p. 490.

BOWLES, E. A., Waltham Cross. Collection of seeds. Plants raised for distribution.

BOYCE, J. W., Welney, Wisbech. Potatos. See p. 490.

BRIGHT, F., Reading. Dahlia. See p. 429.

BROWN, T. J., Colchester. Potatos. See p. 490.

BROWN, Messrs., Peterborough. Potato 'Stokes Champion.' See p. 490.

BUNBURY, Sir H. Bart., Mildenhall, Suffolk. *Pavia indica.* Planted in the Garden.

CAMBRIDGE BOTANIC GARDEN. Collection of seeds. Plants raised for distribution.

CANNELL, Messrs., Loddon, Norwich. Cauliflower (see p. 486); lettuce (see p. 266); radishes; pea (see p. 498); potato (see p. 490); tomato (see p. 497).

CARMICHAEL, M., Oban, N.B. Collection of seeds and plants from Central Africa, including *Anomatheca grandiflora*, *Oxalis convexula*, *Dorstenia Walleri*, and *Gloriosa Rothschildiana.*

CARTER, Messrs., High Holborn. Annuals; tomatos (see p. 497); potatos (see p. 499); lettuces (see p. 266); cauliflowers (see p. 486); beans (see p. 472). Seed for experimental purposes.

CARVILL, H. F., Langdale, Orpington. Strawberry 'Dreadnought.' Added to collection.

CHAPMAN, W. H., Tateley. Dahlia. See p. 429.

CHELSEA PHYSIC GARDEN. Collection of seeds. Plants raised for distribution.

CLARK, Messrs., Dover. Dahlia. See p. 429.

CLOSE, Miss, Eaton Square, S.W. Collection of seeds. A few germinated, and are growing on.

COCKER, Messrs., Aberdeen. Potato 'The Factor.' See p. 496.

COLLINS, T., Kilnaboy, Co. Clare. Potatos. See p. 490.

CRACOW BOTANIC GARDEN. Collection of seeds. Plants raised, and in part distributed to Fellows.

CURWEN, E., Brighton. Vine 'Red Cape Haanepoot.' Growing on.

CUTHBERT, Messrs., Southgate. Collection of Magnolias. Planted in the Garden.

DAVIES-EVANS, Mrs., Llanbyther. Collection of orchids. Growing in the Garden.

DEAN, A., Kingston. Soya beans. See p. 476.

DENT, Major, Wetherby. White seedling Delphinium. Planted in the Garden.

DEW, A. A., Coalville. Potato 'Dews Favourite.' See p. 496.

DICKSON, Messrs., Belfast. Potatos (see p. 496); and French bean (see p. 476).

Divers, W. H., Grantham. Dahlia 'Pompadour.' See p. 429.

Dobbie, Messrs., Rothesay. Potatos (see p. 490); French beans (see p. 476); annuals; dahlia 'Sentinel' (see p. 429); pentstemons (see p. 436).

Doveton, Mrs., Westcliff. Bulbs from S. Africa. Dead when received.

Durlache, A. F., Twickenham. Collection of seeds. A few plants growing on.

Dyke, Rt. Hon. Sir W. H., Bart., Eynsford. Antirrhinums; pentstemons (see p. 436).

Dykes, W. R., Godalming. Seed of *Iris Clarkei.* A few plants raised, and planted in the Garden. Plants of *I. benacensis.* Added to collection.

Earle, Mrs., Cobham. Pelargoniums. *Pavia alba.* Planted in the Gardens.

Edinburgh Botanic Gardens. Collection of seeds. Plants raised for distribution to Fellows.

Engelmann, C., Saffron Walden. Carnations for trial.

Evans, J. Spencer, Newbury. Seed of *Camellia Thea,* &c. Plants raised for distribution to Fellows.

Fabius, Mr., Emsworth. Plants of Giant-flowered Cyclamen.

Fenn, R., Sulhamstead. Potatos for trial in 1910.

Fenwick, G., Stamford. Pentstemon cuttings. Will be tried in 1910.

Field, J. B., Dorking. Orchids, including many rare species. Added to the collection.

Floyer, Mrs., Basingstoke. Seed of Pillow-case plant.

Forbes, J., Hawick. Annuals; pentstemons (see p. 436).

Fowler, J. Gurney, S. Woodford. *Cypripedium × callosum Sanderae × bellatulum album.* Added to collection. Capsicum seed. Growing on.

Fox, H., Falmouth. *Lomaria procera, Arundinaria Hookeriana,* &c. Planted in the Garden.

Fraser, J., Kew. Seeds of *Draba rupestris.*

Gentle, A. G., Berkhamsted. Pea. See p. 498.

Gibbs, Hon. V., Elstree. Runner bean (see p. 476); pentstemons (see p. 436); asters. Planted in the Garden.

Gibson, A., Cheddar. Potato. See p. 490.

Gibson, H. A., Wedmore. Potato. See p. 490.

Gladstone, Hon. Mrs., Chester. Collection of imported orchids. Added to the collection.

Greaves, Miss A., Reigate. Three unnamed pelargoniums. Growing on.

Grieve, Messrs., Edinburgh. Early chrysanthemums. Will be tried in 1910.

Hanbury, Lady, Ventimiglia, Italy. Collection of seeds. Plants raised for distribution.

Harrison, C., Farnham Royal. Seeds from Zambesi. Some growing on.

Harrison, Messrs., Leicester. Beans (see p. 476); beet (see p. 500); broccoli (see p. 486); cabbage (see p. 499); carrot (see p. 500); cauliflower (see p. 486); lettuce (see p. 266); onion (see p. 501); parsnips (see p. 501); peas (see p. 498); radishes; tomato (see p. 497); turnip (see p. 500).

Haws, J., Clapton, N.E. Improved watering-can. See p. 502.

Heinemann, F.C., Erfurt. Beans (see p. 476); cauliflowers (see p. 486); lettuce (see p. 266).

Herrod, M., Wisbech. Potato. See p. 490.

Hill, D., Watford. *Gentiana acaulis* and *Primula rosea.* Planted in the Garden.

Hillier, Messrs., Winchester. Arundinarias, *Acer rufinerve, Abutilon vitifolium, Cotoneaster frigida,* Eucalypti, and *Yucca gloriosa.* Planted in the Garden.

Hobbies, Messrs., Dereham. Potato 'The Factor' (see p. 496); dahlias (see p. 429).

Holmes, E. M., Sevenoaks. Seeds of *Aconitum spp.* Not yet germinated.

Holmes, W. G., Tain, N.B. Potatos (see p. 490); peas (see p. 498).

Horton, W. P., Seaford. Collection of seeds from New Zealand. Failed to germinate.

Howard, Messrs., Massachusetts. Strawberry seedling No. 17. Added to the collection.

Hurst, Messrs., London, E. Pea. See p. 498.

India, Agricultural and Horticultural Society of, Calcutta. Collection of seeds. Plants raised, and in part distributed to Fellows.

Ingle, W. B., Blackheath. Collection of Australian seeds. A few germinated and are growing on.

Jacob, Rev. J., Whitchurch, Salop. Bulbs of tulip 'Mrs. Wolseley.' Added to the collection.

Jeffrey, F. W., Cathcart, N.B. *Antirrhinum, Arcturus.* Plants raised and distributed to Fellows.

Jeyes' Sanitary Compounds Co., Cannon Street, London. Jeyes' fluid, and Cyllin soft soap. Will be reported on in 1910.

Kemmis, Mrs., Midhurst. *Tacca cristata.* Growing on.

Kew, Royal Botanic Gardens. Collection of seeds. Plants raised for distribution.

Kitley, T., Bath. *Saxifraga decipiens* var. *bathoniensis.* Planted on Rockery.

Knight, W., Hailsham. Raspberry 'Hailshamberry.' Added to the collection.

Lambert, Mrs. A., Banstead. Seeds from New Zealand. Not yet germinated.

Laver, J., Devizes. Long-standing kale.

Lawrence, Sir Trevor, K.C.V.O., V.M.H., Burford. *Crinum Powelli alba* and *C. Moorei*, planted in the Gardens. Pelargonium 'Sir T. Lawrence,' growing on. Cuttings of hardy shrubs, growing on.

Laxton, Messrs., Bedford. Seedling fruit trees. Added to the collection. Strawberries. Added to the collection.

Letts, S., Long Buckley. Carnations. Added to the collection.

Lewis, H., S. Croydon. *Ranunculus glacialis*, *Geum reptans vera*, *Dianthus sylvestris*, *Saxifraga varians*, and *S. aspera bryoides.* Planted in the Garden.

Littlewood, Mrs., Cheltenham. Collection of seeds. Plants raised for distribution.

Loder, Sir E., Bart., Horsham. Potatos (see p. 490); runner bean (see p. 483); melon (see p. 499). Collection of seeds. Distributed to Fellows.

Low, Messrs., Bush Hill Park. Carnations. For trial. Roses 'Lyon' and 'White Killarney.' Added to the collection.

Mackie, Messrs., Fyvie, Aberdeen. Potato. See p. 490.

McKeddie, Mrs., Greenhithe. Pea. See p. 498.

Marshall, W., V.M.H., Bexley. *Lithospermum prostratum*, and *L. prostratum* 'Celestial Blue.' Planted on Rockery. *Crinum sp.* Growing on. 'Quassop' Insecticide. See p. 502.

Mason, Lady Evelyn, Witney. Collection of seeds from India. Not yet germinated.

Massey, Messrs., Spalding. Potatos (see p. 490); Brussels sprouts (see p. 500); cauliflowers (see p. 486); lettuce (see p. 266).

Maxwell, Rt. Hon. Sir H., Bart., J.P., Whauphill. *Hypericum fragile.* Planted on Rockery.

May, Messrs., Up. Edmonton. *Primula obconica* and *Pteris Nicholsonii.* Growing on.

Micrometrical Engineering Co., London, E.C. Higginson's spraying machine. See p. 502.

Miller, G. W., Wisbech. Potatos (see p. 490); apple 'Red Victoria.' Added to collection.

Mitchell, A., Northleagh, Gloucester. Potato. See p. 490.

Mitchelson, A., Wonersh. Melon. See p. 498.

Mold, F., Banbury. Potato. See p. 490.

Moore, Messrs., Rawdon. Collection of orchids.

Musgrave, J., Gosforth. Narcissus 'Morning Star.' Planted in the Garden.

North Western Cyanamide Co. Calcium cyanamide. See p. 502.

Notcutt, R. C., Woodbridge. Potatos. See p. 490.

Nutting, Messrs., Southwark Street, S.E. Cauliflowers (see p. 486); lettuce (see p. 266); annuals.

Osborne, J. H., China Raffia. See p. 502.

Ottawa Horticultural Society. Gladiolus 'Bresaya.' Died.

Page, Messrs. Carter, London Wall, E.C. Dahlia. See p. 429.

Page, W. H., Hampton. Collection of carnations for trial.

Parr, H., New Barnet. Melon 'Trent Perfection.' For trial in 1910.

Paton, J. A., Castle Kennedy, N.B. Potatos. See p. 490.

Paul, F. F., Botley. Tomato (see p. 497); tomato 'Paul's No. 1.' For trial in 1910.

Paul, Messrs., Cheshunt. Roses 'White Dorothy' and 'Lady Godiva.' *Galega officinalis alba.* Planted in the Garden.

Pearson, Miss, Earls Colne. *Aechmea sp.* and seed of *Melampyrum arvense.* Failed.

Peck, E. J., Bath. *Actinotus Helianthi.* Failed.

Pemberton, Miss, Havering, Essex. Border carnation. Added to trial.

Perez, Dr. G. V., Teneriffe. Seeds of *Juniperus Cedrus.* For distribution to Fellows.

Pfitzer, W., Stuttgart. Lettuce (see p. 266); annuals; pentstemons (see p. 436).

Pickering, Rev. J., Ashburton. Potatos. See p. 490.

Pirie, D. V., Kinellar, N.B. *Lonicera biflora.* Planted in the Garden.

Pirie, Miss, Ripley. *Rudbeckia* var. Planted in the Garden.

Poulsen, D. T., Copenhagen. Cauliflowers. See p. 486.

Reuthe, G., Keston. *Crinodendron Hookeri* and *C. dependens.*

Rippon, Lt.-Col. G., Burma. Seeds of *Luculia gratissima*, and plants of *Vanda coerulea.* Distributed to Fellows.

Robson, H. L., Ripley. Stock.

Roemer, F., Quedlinberg. Annuals.

Row, W. N., Tiverton. Seeds of *Zizania aquatica.* Failed to germinate. Collection of violets. Planted in the Gardens.

Rutter, Messrs., Wisbech. Potato. See p. 490.

Sandemann, Lt.-Col. J., Hayling Is. Vine 'Moscatel de Jésus.' Failed. Collection of seeds. Plants raised, and in part distributed to Fellows.

Sander, Messrs., St. Albans. Orchids. Added to the collection.

Sands, W. E., Hillsborough, Co. Down. Potatos. See p. 490.

Scott-Moncrieff, W. D., Laleham. Double Broom from Island of Ischia. Planted in the Garden.

Scrase-Dickens, C., Achill. *Dierama pendula.* Planted in the Garden. Early-flowering Gladioli. For trial in 1910.

Seale, M. V., Sevenoaks. Dahlias. See p. 429.

Sinclair, M. H., Aberdeen. Potatos. See p. 490.

Smythe, Col., Churt. *Nelumbium* seeds.

Sontellinho, Baron de, Oporto. Collection of seeds. Plants raised, and in part distributed to Fellows.

Spruyt, Messrs., Utrecht. Beans (see p. 476); beet (see p. 500); cabbages (see p. 499); carrots (see p. 500); cauliflowers (see p. 486); celery (see p. 501); leek; lettuce (see p. 266); pea (see p. 498); radishes; scorzonera (see p. 500); spinach (see p. 500).

Stoop, F. C., Byfleet. Asters 'Beauty of Colwall' and 'Miss Gainsford.' *Veronica Balfouriana* and *V.* 'Royal Blue.' Planted in the Garden. *Acalypha marginata.* Growing on in the Garden.

Storrie, Messrs., Glencarse, N.B. Patent plant frame. See p. 502.

Sutton, Messrs., Reading. Potato (see p. 490); beans (see p. 476); cauliflowers (see p. 846); lettuces (see p. 266); seeds for experimental purposes.

Sydenham, R., Birmingham. Bean (see p. 476); tomato (see p. 497); annuals. *Gerbera Jamesonii.* Growing on.

Taylor, G., Ferrybridge, Yorks. Potato. See p. 490.

Taylor, Mrs. L. H., Henley-on-Thames. Seeds of *Paliurus australis.* Few plants growing on.

Thompson, Mrs. M., Worplesdon. Seeds of *Thermopsis laburnifolia.* Some plants raised, and growing on.

Tinne, Miss, Liverpool. Seeds from W. Australia. Not yet germinated.

Troyte-Bullock, Miss, Yeovil. Collection of pelargoniums. Growing on.

Turner, W. F., Massachusetts. Dahlia. See p. 429.

Usherwood, Rev. T. E., St. James's Court, S.W. Collection of seeds. Germinated and growing on.

Veitch, Messrs. J., Chelsea. Stocks. Budded during the summer. Beans (see p. 476); lettuce (see p. 266); cauliflowers (see p. 486); potatos (see p. 490); annuals. Raspberries. Received late, and died.

Veitch, Messrs. R., Exeter. Potatos (see p. 490); beans (see p. 476); melon (see p. 498); tomato (see p. 497); cucumber (see p. 501); cauliflowers (see p. 486); cabbages (see 499); lettuce (see p. 266); annuals.

Veriquic Planter Co., Maidstone. Veriquic planter (see p. 502).

Vienna Univ. Botanic Garden. Collection of seeds. Plants raised, and in part distributed to Fellows.

Vilmorin-Andrieux, Messrs., Paris. Cauliflowers (see p. 486); beans (see p. 476); lettuce (see p. 266); annuals; dahlias (see p. 429.). Chrysanthemums. For trial in 1910.

Voss, Messrs., London, E. Grease bands, and banding grease. See p. 502.

Wakefield, Mrs., Uxbridge. Collection of seeds from Australia. Not yet germinated.

Wakely, C., Chelmsford. *Solanum* '*etuberosum.*' Growing in Garden.

Wakerley, F., Kingston, Derby. Potatos. See p. 429.

Walker, G., Paddington Green. Seeds of *Luffa aegyptica.*

Wallace, Messrs., Colchester. Pentstemon. See p. 436.

Wallis, R. J., Newdigate. *Larix Kaempferi,* planted in the Gardens. Seed of Statices. *Aquilegia.* Plants raised.

Walpole, E., Dublin. Colleetion of seeds. In part distributed to Fellows.

Walter, A., Walton-on-Thames. *Coreopsis grandiflora, Alstroemeria chilensis hybrida, Achimenes,* large blue. Distributed to Fellows.

Watson, J. N. H., Falmouth. Seeds of acacias. Raised for distribution to Fellows.

Way, J. H., Bristol. Seed of *Tulipa Sprengeri.* Not yet germinated.

Wells, Messrs., Merstham. Chrysanthemums for trial. Will be tried in 1910.

Wells, Miss, Rogate. Seeds of *Coreopsis grandiflora, Campanula Medium,* and *Delphinium* var. Distributed to Fellows.

Wesker, W., Wandsworth Common. Runner bean 'Wesker's Prolific.' See p. 483.

West, J. D., Brentwood. Dahlias. See p. 429.

Wheeler, H. J., Seven Kings, Essex. Border carnations. For trial in 1910.

White, E. A., Paddock Wood. Abol syringe (see p. 502); Abol W.S. insecticide (see p. 503); Abol magnifying glass (see p. 502).

White, H., Windlesham. Ten *Erica cinerea coccinea.* Planted in the Gardens.

Wigley, H., Gravesend. Kale.

Wilders, S., Swanwich, Derby. Potato. See p. 429.

Wilding, E. H., Stoke Poges. Seed of *Hyoscyamus niger* var. *pallidus.* Not yet germinated.

Wilks, Rev. W., M.A., Shirley. *Crinum Powelli*, *C. Powelli album*, *C. Moorei*, and *Zephyranthes carinata*. Planted in the Garden. Seed of Shirley Poppies.

Willmott, Miss, V.M.H., Warley. Collection of seeds. Plants raised, and in part distributed to Fellows.

Wilson, E., Oundle. Potato. See p. 490.

Wilson, Mrs., Weybridge. Hardy vines. Added to the collection.

Wood, Messrs., Wood Green. Grape storing bottle. See p. 502.

Wood, Mrs., Woking. *Atropa Belladonna.* Planted in the Gardens.

Woodward, R., Temple, E.C. Seeds of *Acer rubrum.* Distributed to Fellows.

Wolley-Dod, Major, Walton-on-Thames. Aster 'Mrs. Frazer.' Growing in the collection.

Worsley, A., Isleworth. Collection of Phyllocacti. Growing on in the Garden.

Young, Miss, Gulmery, Kashmir. Plants from Kashmir. Arrived in a state of decay.

NOTES ON RECENT RESEARCH

AND

SHORT ABSTRACTS FROM CURRENT PERIODICAL LITERATURE, BRITISH AND FOREIGN,

AFFECTING

HORTICULTURE & HORTICULTURAL SCIENCE.

JUDGING by the number of appreciative letters received, the endeavour commenced in volume xxvi. to enlarge the usefulness of the Society's Journal, by giving an abstract of current Horticultural periodical literature, has met with success. It has certainly entailed vastly more labour than was anticipated, and should therefore make the Fellows' thanks to those who have helped in the work all the more hearty.

There are still, we feel, some departments of Horticulture and Horticultural Science very imperfectly represented in these abstracts, and the Editor would be grateful if any who have time at command, and who are willing to help in any special direction in this work, would communicate with him. He desires to express his most grateful thanks to all who co-operate in the work, and he ventures to express the hope that they will all strictly adhere to the general order and scheme of working, as the observance of an identical *order* can alone enable the Editor to continue to cope with the work. The order agreed on is as follows :—

1. To place first the name of the plant, disease, pest, &c., being noticed ; and in this, the prominent governing or index word should always have precedence.
2. To place next the name, when given, of the author of the original article.
3. Then, the abbreviated form of the name of the journal, &c., in which the original article appears, taking care to use the abbreviation which will be found on pp. 264, 265.
4. After this, a reference to the number, date, and page of the journal in question.
5. If an illustration be given, to note the fact next, as "fig.," "tab.," or "plate."

6. After these preliminary necessities for making reference to the original possible for the reader, the abstract or digest should follow, ending up with the initials of the contributor affixed at the close of each Abstract or Note.

NAMES OF THOSE WHO HAVE KINDLY CONSENTED TO HELP IN THIS WORK.

Baker, F. J., A.R.C.S., F.R.H.S.
Ballard, E., F.R.H.S.
Beer, R., B.Sc., F.L.S., F.R.H.S.
Boulger, Professor G. S., F.L.S., F.R.H.S.
Bowles, E. A., M.A., F.L.S., F.E.S., F.R.H.S.
Bunyard, E. A., F.R.H.S.
Chapman, H., F.R.H.S.
Chittenden, F. J., F.L.S., F.R.H.S.
Cook, E. T., F.R.H.S.
Cooke, M. C., M.A., LL.D., A.L.S., F.R.H.S., V.M.H.
Cotton, A. D., F.L.S.
Darlington, H. R., F.R.H.S.
Druery, C. T., V.M.H., F.L.S., F.R.H.S.
Dykes, W. R., M.A., F.R.H.S.
Farmer, Professor J. B., M.A., D.Sc., F.R.H.S.
Groom, Professor Percy, M.A., D.Sc., F.L.S., F.R.H.S.
Hartog, Professor Marcus, D.Sc., M.A., F.L.S., F.R.H.S.
Hawes, E. F., F.R.H.S.
Henslow, Rev. Professor Geo., M.A., F.L.S., F.R.H.S., V.M.H.
Hodgson, M. L., F.R.H.S.
Hooper, Cecil H., M.R.A.C., F.R.H.S.
Houston, D., F.L.S., F.R.H.S.
Kent, A. H., A.L.S., F.R.H.S.
Long, C. H., F.R.H.S.
Massee, Geo., F.L.S., F.R.H.S., V.M.H.
Newstead, R., A.L.S., F.E.S., F.R.H.S.
Pethybridge, G. H., B.Sc., Ph.D., F.R.H.S.
Petts, Alger, F.R.H.S.
Rendle, A. B., M.A., D.Sc., F.L.S., F.R.S., F.R.H.S.
Reuthe, G., F.R.H.S.
Saunders, Geo. S., F.L.S., F.E.S., F.R.H.S.
Scott-Elliot, G. F., M.A., B.Sc., F.L.S., F.R.H.S., F.R.G.S.
Smith, William G., B.Sc., Ph.D., F.R.H.S.
Veitch, Harry J., F.L.S., F.Z.S., F.R.H.S.
Voss, W. A., F.C.S., F.R.H.S.
Webster, A. D., F.R.H.S.
Welby, F. A., F.R.H.S.
Williams, S. E., F.R.H.S.
Wilson, Gurney, F.L.S., F.R.H.S.

JOURNALS, BULLETINS, AND REPORTS

from which Abstracts are made, with the abbreviations used for their titles.

Journals, &c.	Abbreviated title.
Agricultural Gazette of New South Wales	Agr. Gaz. N.S.W.
Agricult. Journal, Cape of Good Hope	Agr. Jour. Cape G.H.
Annales Agronomiques	Ann. Ag.
Annales de la Soc. d'Hort. et d'Hist. Naturelle de l'Hérault	Ann. Soc. Hé.
Annales de la Soc. Nantaise des Amis de l'Hort.	Ann. Soc. Nant. des Amis Hort.
Annales des Sciences Naturelles	Ann. Sc. Nat.
Annales du Jard. Bot. de Buitenzorg	Ann. Jard. Bot. Buit.
Annals of Botany	Ann. Bot.
Beiheft zum Botanischen Centralblatt	Beih. Bot. Cent.
Boletim da Real Sociedade Nacional de Horticultura	Bol. R. Soc. Nac. Hort.
Boletim da Sociedade Broteriana	Bol. Soc. Brot.
Botanical Gazette	Bot. Gaz.
Botanical Magazine	Bot. Mag.
Bulletin de la Société Botanique de France	Bull. Soc. Bot. Fr.
Bulletin de la Soc. Hort. de Loiret	Bull. Soc. Hort. Loiret.
Bulletin de la Soc. Mycologique de France	Bull. Soc. Myc. Fr.
Bulletin Department of Agricult. Brisbane	Bull. Dep. Agr. Bris.
Bulletin Department of Agricult. Melbourne	Bull. Dep. Agr. Melb.
Bulletin of the Botanical Department, Jamaica	Bull. Bot. Dep. Jam.
Bulletin of Bot. Dep. Trinidad	Bull. Bot. Dep. Trin.
Bulletino della R. Società Toscana d' Orticultura	Bull. R. Soc. Tosc. Ort.
Canadian Reports, Guelph and Ontario Stations	Can. Rep. G. & O. Stat.
Centralblatt für Bacteriologie	Cent. f. Bact.
Chronique Orchidéenne	Chron. Orch.
Comptes Rendus	Comp. Rend.
Department of Agriculture, Victoria	Dep. Agr. Vict.
Department of Agriculture Reports, New Zealand	Dep. Agr. N.Z.
Dictionnaire Iconographique des Orchidées	Dict. Icon. Orch.
Die Gartenwelt	Die Gart.
Engler's Botanische Jahrbücher	Eng. Bot. Jah.
Gardeners' Chronicle	Gard. Chron.
Gardeners' Magazine	Gard. Mag.
Gartenflora	Gartenflora.
Journal de la Société Nationale d'Horticulture de France	Jour. Soc. Nat. Hort. Fr.
Journal Dep. Agricult. Victoria	Jour. Dep. Agr. Vict.
Journal Imperial Department Agriculture, West Indies	Jour. Imp. Dep. Agr. W.I.
Journal of Agricultural Science	Jour. Agr. Sci.
Journal of Botany	Jour. Bot.
Journal of Chemical Society	Jour. Chem. Soc.
Journal of Economic Biology	Jour. Econ. Biol.
Journal of Economic Entomology	Jour. Econ. Entom.
Journal of Horticulture	Jour. Hort.
Journal of the Board of Agriculture	Jour. Bd. Agr.
Journal of the Linnean Society	Jour. Linn. Soc.
Journal of the Royal Agricultural Society	Jour. R.A.S.
Journal S.E. Agricultural College, Wye	Jour. S.E. Agr. Coll.
Kaiserliche Gesundheitsamte	Kais. Ges.
La Pomologie Française	Pom. Franc.
Le Jardin	Le Jard.
Lebensgeschichte der Blutenpflanzen Mitteleuropas	Lebens. d. Blutenpfl.
Mendel Journal	Mendel Jour.
Naturwiss. Zeitschrift Land und Forst	Nat. Zeit. Land-Forst.
Notizblatt des Königl. Bot. Gart. und Museums zu Berlin	Not. König. Bot. Berlin.
Orchid Review	Orch. Rev.

Journals, &c.	Abbreviated title
Orchis	Orchis.
Proceedings of the American Pomological Society	Am. Pom. Soc.
Queensland Agricultural Journal	Qu. Agr. Journ.
Reports of the Missouri Botanical Garden	Rep. Miss. Bot. Gard
Revue de l'Horticulture Belge	Rev. Hort. Belge.
Revue générale de Botanique	Rev. gén. Bot.
Revue Horticole	Rev. Hort.
The Garden	Garden.
Transactions Bot. Soc. Edinburgh	Trans. Bot. Soc. Edin.
Transactions of the British Mycological Soc.	Trans. Brit. Myc. Soc.
Transactions of the Massachusetts Hort. Soc.	Trans. Mass. Hort. Soc.
U.S.A. Department of Agriculture, Bulletins	U.S.A. Dep. Agr.*
U.S.A. Experimental Station Reports	U.S.A. Exp. Stn.†
U.S.A. Horticultural Societies' publications	U.S.A. Hort. Soc.†
U.S.A. State Boards of Agriculture and Horticulture	U.S.A. St. Bd.†
Woburn Experiment Farm Report	Woburn.

* The divisions in which the U.S.A. Government publish Bulletins will be added when necessary.

† The name of the Station or State will in each case be added in full or in its abbreviated form

NOTES AND ABSTRACTS.

Abelia uniflora, R. Br. By J. Luquet (*Le Jard.*, vol. xxiii. No. 539, p. 232; August 5, 1909).—The author tries to clear up the confusion as to this elegant Caprifoliaceous plant. The two hardy species are *Abelia uniflora* and *A. trifolia*, the former being commonly known as *A. floribunda*, from which, however, it is quite distinct. *A. rupestris* and *A. chinensis* again are only forms of *A. uniflora*. The latter deserves to be more widely cultivated, since it will withstand severe winters, and in a sunny place flowers uninterruptedly till the frosts begin. Naturally about 1 m. in height, it can be pruned into a compact, round bush, which is covered with pinkish flowers, and the long brown calyces persist long after the petals drop off.—*F. A. W.*

Agave Wrightii. By J. R. Drummond (*Bot. Mag.* tab. 8271).—Nat. ord. *Amaryllidaceae*; tribe *Agaveae*. C. America. Trunk short; leaves 16–18 inches long; flowers on a spike 7 feet long, perianth lobes dark green with a creamy-white border.—*G. H.*

Akebia lobata. By F. Rebhuhn (*Die Gart.* Sept. 11, 1909, p. 437).—A somewhat rare climber, resembling the old *Akebia quinata* in every respect, apart from the leaves, which in *A. lobata* have three lobes, in *A. quinata* five. The plant has also larger fruits and is more vigorous. It is quite hardy in many places, and will grow in sheltered and shady positions as well as in sunny or exposed places.—*G. R.*

Aleyrodidae of Barbados. By C. C. Gowdey, B.Sc. (*Journ. Imp. Dep. Agr. W.I.*, vol. ix. No. 4, 1909; 2 plates and 3 cuts).—This is an enumeration of the species of Aleyrodidae known to inhabit Barbados, with descriptions of the insects, larva and adult, habits and food plants; in all eleven species.—*M. C. C.*

Aloe rubrolutea. By A. Berger (*Bot. Mag.* tab. 8263).—Nat. ord. *Liliaceae*; tribe *Aloineae*. Trop. S.W. Africa. Stem stout, 8 feet in height; leaves about 20 in a rosette, 2 feet long; panicle much branched; racemes 1 foot long; flowers drooping, perianth bright red.—*G. H.*

Alpine Garden: "La Jaysinia" at Samoëns (Haute-Savoie). By M. Mottett (*Jour. Soc. Nat. Hort. Fr.*, July 1909, p. 138; plates).—An illustrated description of the interesting rock garden known as "La Jaysinia," which Madame Cognacq has laid out and stocked with a choice collection of Alpine and rock plants, and has presented to her native commune of Samoens. In two points only does M. Mottett consider that the designer of the garden has laid himself open to criticism. One is in his rather Philistine method of tampering with the ruins of an old castle in the grounds, and the other is in his too free use of cement among the stones, which is unsuitable in appearance and not really so good for the plants.—*M. L. H.*

Alpines, should they be manured? By S. Arnott (*Garden*, April 17, 1909, p. 190).—The answer given is that manures may be valuable to alpines, but all do not require them, and not every kind of manure is suitable, nor should they be used very often. Stable and cow manure should be very old and decayed. Before applying (in spring) they should be dried and powdered; for artificials a mere pinch is enough; bone manure should not be given to plants which dislike lime. A liquid manure recommended for watering in summer is composed of 80 gallons of water and 90 grains each of nitrate of lime, sulphate of magnesia, and nitrate of potash.

E. H. Jenkins (*Garden*, May 8, 1909, p. 224) confirms this opinion, but he states that woolly leaved subjects, like the Androsaces, do not require manures, and the Onosmas and *Omphalodes Luciliae* are easily poisoned by organic manures, and for alpines generally quick-acting or highly concentrated manures should be avoided.—*H. R. D.*

Ammonium Salts, Direct Assimilation by Plants. By H. B. Hutchinson and N. H. J. Miller (*Jour. Agr. Sci.* iii. (1909), p. 179).—When soils continually receive ammoniacal manures, they eventually become acid and the formation of nitrates by nitrifying organisms is prevented, yet many plants are able to develop, thus suggesting that they are capable of absorbing and making use of ammonium salts. Much difference of opinion has been expressed by agricultural chemists and vegetable physiologists as to whether ammonia could be made use of, and it is generally supposed that nitrates only can be assimilated, but the present paper shows that many plants are able to produce normal growth when supplied with nitrogen in the form of ammonium salts, under conditions which completely exclude the possibility of nitrification. Plants, however, differ in this respect, and some appear to prefer nitrates, while others are able to grow equally well, whether supplied with ammonium salts or with nitrates. Some, again, prefer ammonium salts to commence with and nitrates later on. Plants which take up nitrogen exclusively in the form of ammonium salts generally contain distinctly higher percentages of nitrogen than when supplied with nitrates. It is suggested that possibly the high percentages of nitrogen in leguminous plants may be due to the nitrogen, or most of it, being assimilated in a form more suited to the rapid production of proteids than nitrate.

F. J. C.

Anæsthesia of Plants. By P. Noel (*Le Jard.*, vol. xxiii. No. 532, p. 126: April 20, 1909).—An interesting application of M. Johannsen's now well known theories *re* Etherization and Forcing has been made in Normandy. Finding that the late frosts invariably destroyed his crop of plums, M. Noel made a hole 40 inches deep at the foot of the tree and poured in 200 cc. of chloroform or ether. The blossoming was delayed a fortnight and the trees did not flower till the frosts were over. There was a good crop of fruit. In this case it would seem as though the mere cooling of the ground by the ether, not anæsthesia, had produced the desired effect.—*F. A. W.*

Anthurium trinerve. By N. E. Brown (*Bot. Mag.* tab. 8251).—Nat. ord. *Araceae.* Brazil and Guiana. Herb, 4–12 inches high, clothed with fibrous remains of leaves; leaves petiolate; blades 4–7 inches long, 1–3 inches wide; spathe erect, to ⅘ inch, green; spadix sessile, ⅖–2 inches long, white; berries ⅓–½ inch long, ellipsoid, lilac.—*G. H.*

Ants and Roses (*Garden*, July 3, 1909, p. 323).—Mrs. A. Gorell Barnes has got rid of Ants from Roses by sponging the roses with a solution of Quassia and soft soap, and trapping the ants in inverted pots filled with grass and leaves. Edmund Charrington finds the use of wood ashes to be successful. J. J. K. has been successful by laying dead sparrows on the bed as a counter-attraction, and J. B. Burton by Vaporite. On the other hand A. H. Woolley Dod (July 10, 1909, p. 334) finds trapping in pots, though it kills large numbers, to be no cure, while Vaporite is only effective in making the ants move on "a few inches." Thomas Davies finds puddling the ground to be effective.—*H. R. D.*

Aphelandra tetragona. By O. Stapf (*Bot. Mag.* tab. 8272).—Nat. ord. *Acanthaceae*; tribe *Aphelandreae.* Trop. S. America. Shrubby; leaves ovate-lanceolate, 8–10 inches long; spikes 3–5-nate, the terminal 6–7 inches long; corolla brilliant pink; limb 3–4 lines wide, tube, 2 inches long.—*G. H.*

Aphides in N. America. By H. F. Wilson (*Jour. Econ. Entom.* ii. (1909), 5, p. 346).—A new aphis pest of the banana *Pentalonia nigronervosa*) is described and figured and two other species *Aphis angelicae* on angelica and ivy, and *Drepanosiphon platanoides* on maple (both of which occur in Europe) are described from California.—*F. J. C.*

Apple Culture in Vermont. By Wm. Stuart (*U.S.A. Exp. Stn., Vermont, Bull.* 141; April 1909; 13 figs.).—Modern commercial apple culture is in its infancy in Vermont, and this bulletin deals with the various aspects of the business from the choice of a site to the disposal of the crop. The cost of production of a barrel of apples (picked, graded, and packed) is estimated at 75 cents to $1, and the profits at $20 to $175 the acre, well-managed apple orchards in Western New York being made to pay 10 per cent. or more on a valuation of $1,000 the acre, while orchards in some of the Western States have changed hands at more than twice this figure.
A. P.

Apple, New Varieties. By W. A. Taylor (*U.S.A. Dept. Agr. Year Book*, 1907, pp. 305–6; 2 plates).—*Delicious*, a new variety, resembling 'Williams Favourite'; *Ensee*, a new variety of the Washington type.
E. A. Bd.

Apple Worm, Eggs and Stages of the Lesser. By E. P. Taylor (*Jour. Econ. Entom.* ii. (1909), 3, p. 237.)—This insect (*Enarmonia prunivora* Walsh) is shown to lay its eggs, of which a description is now for the first time published, upon small apples and the upper surface of apple leaves, as does the codling moth. The eggs are about half the size of those of the codling moth and are laid a little later in June.—*F. J. C.*

Apple Orchards. By S. B. Hartman and H. J. Eustace (*U.S.A. Exp. Stn. Michigan, Bull.* 258; March 1909).—Describes the gradual improvement in crop and value of certain orchards when well pruned, cultivated, and sprayed, with results for five years, also hints on improving neglected orchards, information on spraying and costs of the various outfits for spraying. Among other useful notes it says: a leather pad fitted on the extension rod just above the hand affords some protection from the drip. A little vinegar will easily and completely clean the hands from Bordeaux mixture. The horses drawing the spraying apparatus should be covered with a canvas sheet to protect them from the spray fluids.—*C. H. H.*

Apple Orchard, Tillage v. Grass in an. By U. P. Hedrick (*U.S.A. Exp. Stn., New York, Bull.* 314; March 1909; 7 plates).—This Station is conducting two experiments to determine whether the apple thrives better in cultivated land or in grass, and this is a preliminary report upon one of these, covering a period of five years. The orchard consists of nine and a half acres of Baldwins planted in 1877 at a distance of 40 feet each way, and until 1903 it was treated uniformly throughout in every respect, the land being under tillage, with an annual cover crop. In October 1903 half was sown with grass, and this has been cut each subsequent year in June, sometimes again later, and the grass left as it fell from the mower, this being known as the sod-mulch system. The method of tillage of the other half of the orchard each year has been spring ploughing with cultivation till late July, followed by a cover crop.

The average annual yield of an acre for the five years (1904–8 inclusive) has been 72·9 barrels on the sod plot and 109·2 barrels on the tilled plot, the average annual net income from an acre being $71·52 for the former and $110·43 for the latter. Not only are the trees in the tilled ground healthier and more vigorous, but the fruit is crisper, more juicy, of better flavour, and of more uniform quality, and in common storage keeps a month longer than that from the sod plot, the only points which might be reckoned in favour of the latter being that the fruit matures from one to three weeks earlier than that on the tilled land, and is much more highly coloured, which latter characteristic, however, the author regards as the hectic flush of disease, purchased at the expense of the health and vigour of the trees.

The conclusion is arrived at that the differences in tree-growth and crop in the two plots are mainly due to differences in moisture, the grass using so much of the water content of the soil that insufficient is left for the proper development of the trees. The top soil of the orchard, however, is shallow—only nine to twelve inches—and the author suggests that the grass might be less harmful in a deeper soil. The rainfall, too, in the neighbourhood of the orchard, averaging 17·78 inches for the six growing months, is seldom sufficient in his views even for the optimum development of an apple crop, and he thinks the trees would not suffer as much in a climate where the rainfall was heavier, thrifty orchards being found even in sod near the Atlantic seaboard, where the rainfall is comparatively high.

The Woburn Farm Reports on the "malignant action" of grass are discussed with an open mind, but the conditions of that farm, with its comparatively recently-planted trees, are so different from those of the orchard under discussion that this report is well worth the study of orchardists in this country.—*A. P.*

Apples and Pears, Best Varieties for Export Growing in Victoria. By James Lang (*Jour. Dep. Agr. Vict.*; February 1909).—Apples: 'Cox's Orange Pippin,' 'Cleopatra,' 'King of the Pippins,' 'Dumelow's Seedling,' 'Munroe's Favourite,' and 'Gravenstein.' Pears: 'Winter Nelis,' 'Joséphine de Malines,' 'Beurré Clairgeau,' 'Glou Morceau,' 'Vicar of Winkfield,' and 'Forelle'; 'Winter Nelis,' being the best.—*C. H. H.*

Apples: a New Form of Sphaeropsis. By Lena Belle Walker (*U.S.A. Exp. Stn., Nebraska,* 1908; with 10 figs.).—Two forms of Sphaeropsis are capable of producing black rot in apple, differing chiefly in the dimensions of the spore—(1) *Sphaeropsis malorum* Peck, and (2) the new *Sphaeropsis*, with larger spores, but still without a specific name. The latter seems to be the more common and the more vigorous grower.—*M. C. C.*

Arbutus Menziesii. By S. A. Skan (*Bot. Mag.* tab. 8249).—Nat. ord. *Ericaceae*; tribe *Arbuteae*. Western North America. Tree, usually 20–50 feet high, 1–4 feet diam.; leaves oblong, $2\frac{1}{2}$–5 inches long, $1\frac{1}{2}$–3 inches wide; flowers in panicles, 5–6 inches across; corolla $\frac{1}{5}$ inch long, urceolate, white; fruit drupe-like, bright orange, $\frac{1}{3}$–$\frac{1}{2}$ inch long.—*G. H.*

Arsenic: its Use in Horticulture. By J. Rutherford Hill (*Trans. Bot. Soc. Edin.*, vol. iv. 1908, pp. 343–345).—A report of value to those who use arsenic in any form. Cases are reported where fowls were found dead, and the cause was traced to the use of an arsenical weed-killer fully six months previously. The weeds were apparently killed at the time, but a strong growth had again appeared in six months, notwithstanding that arsenic was demonstrated to exist still in the soil in considerable amount, and gravel picked up by fowls contained a fatal dose. It is suggested that, as iron was present in the soil, the arsenic may have formed an insoluble compound with it. An important point is that arsenic in the soil has apparently no effect upon the growth of weeds, and it is stated that any alkaline carbonate, such as common salt or washing soda, will kill weeds equally well without the added arsenic.—*E. A. Bd.*

Arsenical Poisoning of Fruit Trees. By W. P. Headden (*Jour. Econ. Entom.* ii. (1909), 3, p. 239.)—The author replies to the criticisms of Dr. Ball upon his paper. (see JOUR. R.H.S. xxxv. 293.)—*F. J. C.*

Asparagus (*Garden*, May 8, 1909, p. 221, Anon).—The writer advises forcing in permanent beds surrounded by brickwork, the necessary heat being obtained from linings of leaves and manure.—*H. R. D.*

Asparagus Beetle, Parasite of. By H. T. Fernald (*Jour. Econ. Entom.*, ii. (1909), 4, p. 278).—The author has discovered a chalcid parasite, belonging to the genus *Tetrastichus*, ovipositing in the eggs of the asparagus beetle, *Crioceris asparagi*. The presence of the parasite apparently had the effect of greatly reducing the number of larvae present on the crop.—*F. J. C.*

Asparagus Fly. By H. Martinet (*Le Jard.*, vol. xxiii. No. 530, p. 83; March 20, 1909).—This insect has recently been ravaging the Asparagus beds to the north of Paris, while those to the south have completely escaped. In the early spring it lays eggs in the young shoots as they emerge from the ground; the larvae hollow out galleries, and the shoots cease to grow, and curl up. The larva takes seven or eight weeks to develop, and the fly comes out at the end of May or beginning of June. It is capable of producing several generations in one year. The object of the note is to urge the destruction of any stunted and infected shoots in *spring*, and not only, as was formerly thought sufficient, in the autumn.—*F. A. W.*

Asparagus tetragonus. By C. H. Wright (*Bot. Mag.* tab. 8288).—Nat. ord. *Liliaceae*; tribe *Asparageae*. S. Africa. Climbing tender shrub, stem armed with decurved thorns, cladodes in fascicles; racemes numerous, 2½ inches long, densely flowered; perianth white.—*G. H.*

Asparagus, To Blanch (*Le Jard.*, vol. xxiii. 534, p. 147; May 20, 1909).—Tubes like drain tiles are largely used for this purpose in France, with excellent results; the young plant shoots up through the tube with a long white stalk, and the leaves develop at the summit. Sawdust is also recommended as a substitute for sand or earth. Celery, sea-kale, &c., can be blanched in the same way.—*F. A. W.*

Basic Slag, The Amount of Free Lime and the Composition of the Soluble Phosphates in. By C. G. T. Morrison, B.A. (*Jour. Agr. Sci.* iii. (1909), p. 161).—Basic slag may be used on soils where to use acid manures such as superphosphate is unwise. The present paper shows the quantity of free lime present in various samples of the manure, a point which has not recently been determined, though statements had been made that it reached as much as 20 per cent. Four typical slags were examined, and the amount of calcium oxide found varied from 5·37 per cent. in the highest to 1·28 per cent. in the lowest; there was also only a small amount of calcium carbonate present in each, in no case exceeding 2·2 per cent., and in one being only ·43 per cent. Thus there would appear to be less free lime in present-day slags than in those of some years ago.

Figures showing the relative powers of citric acid and carbonic acid as solvents of the phosphates are given.—*F. J. C.*

Basic Slag, The Lime in. By James Hendrick (*Jour. Soc. Chem. Ind.* vol. xxviii. July 31, 1909, pp. 775–8; 5 tab.).—The author, after exhaustive tests upon many samples of varying origin and ages, finds that free lime is only present up to about 1 or 2 per cent., and considers that the high figures continuously repeated from one book and journal to another are based upon estimations made when the percentage was much higher than now, the reduction to present figures being probably accounted for by the altered methods of manufacture of steel.

Beyond this small quantity of free lime there was a quantity of lime so loosely combined that it was fully available as a base, and this in the samples tested varied from 14 to 28 per cent. This seems eminently satisfactory, as all the advantages of available lime seem to be obtainable without the wasteful action of free lime upon the nitrogenous constituents of the soil.

The quantity of carbonate present was only trifling.—*W. A. V.*

Beech Disease and its Treatment. By W. D. (*Garden*, August 7, 1909, p. 383).—This is caused by a scale insect, *Cryptococcus fagi.* Two stages are known—the immature insects, which may be seen with a lens running about the trunks in summer, and mature insects, which do not move, and are dormant during autumn, winter, and early spring. The insects cover themselves with wax, and in time a thick white felty mass of them appears, in some instances covering the trunks. Spraying in summer with paraffin emulsion or in early autumn with caustic wash is recommended.—*H. R. D.*

Beet Sugar: Progress of the Industry in America (*U.S.A. Dep. Agr., Report No.* 90; June 1909).—This pamphlet gives statistics of the growth of the Beet Sugar industry in various States of the Union, advocates its extension, gives information of all sorts to intending planters and compares the merits of cane and beet sugar, not to the disadvantage of the latter. Figures are given also of the amount of beet sugar produced in various European countries.—*M. L. H.*

Begonia modica. By O. Stapf (*Bot. Mag.* tab. 8258).—Nat. ord. *Begoniaceae.* Trop. W. Africa. Herb, almost stemless; leaves peltate, 2–3½ inches long, 1½–2½ inches wide; flowers umbelled, yellow; each umbel of 2 stalked males and a single female; sepals 2, lower yellow, upper red, with yellow border, petals 0.—*G. H.*

Begonias, Recent. By P. Lecolier (*Jour. Soc. Nat. Hort. Fr.*, July 1909, p. 450).—M. Billard, of Vesinet, showed a magnificent collection of Begonias at a recent show at Vesinet, most of which were new varieties of his own production and are spoken of with great praise. Among these were 'Madame A. Billard,' double, rose; 'Madame J. Potin,' double, orange yellow, edged red; 'Madame M. Carbillet,' double, deep pink; 'Lamartine,' double, very fine yellow; 'Paul Parré,' superb, rose, frilled; 'Madame P. Parré,' frilled, red; 'Prof. G. Hayem,' tea-rose, yellow; 'Deuil de Makharoff,' blood-red; 'Moi-même,' brilliant red; 'Ami Jean Bard,' orange yellow shot with red.—*M. L. H.*

Berberis pruinosa. By Hort. (*Le Jard.*, vol. xxiii. No. 540, p. 244; August 20, 1909; 1 fig.)—A new and very ornamental Berberis, the upper surface of the leaves being dark green, the under surface silvery. The fruit looks like oxidized silver, and the sprays last well in water.

The shrub is about 1 m. in height and easy to grow, but the seeds are capricious in germinating.—*F. A. W.*

Black Currant. By J. Vercier (*Le Jard.*, vol. xxiii. No. 531, p. 107, also pp. 124 and 187; with figs.).—Either alongside of the vine, as is suggested in this article, or as a separate industry, much may be made of *Ribes nigrum*, the black currant. At present seven million kilogrammes of this fruit are produced in France, and after providing for the manufacture of the *liqueur Cassis* at Dijon and elsewhere are sent over to this country for jams and preserves, on which the author compliments the English makers. A list of varieties under cultivation is given, but all are pronounced inferior to the Naples Royal, which is almost exclusively cultivated in the Côte d'Or. Minute directions for culture are given, but are too lengthy to reproduce here. By the third year the yield of fruit should repay initial cost, and goes on increasing to the seventh or eighth year, when a maximum is attained and kept up. One bush may produce two to three kilos, if standing clear; one field may yield 6,000 kilos, and women can pick the fruit. Even the leaves were formerly valued for their astringent properties, and French doctors are again recommending them, as an infusion, for rheumatism. M. Vercier appeals to his compatriots to learn to make the '*pulpe de cassis*,' which the English excel in.—*F. A. W.*

Bog-Soil, Poisonous Matters in (*Bot. Gaz.* vol. xlvii., No. 5, pp. 389–405, May 1909; with 2 figs.).—Mr. Alfred Dachnowsky describes certain very ingenious experiments which go to prove that the infertility of many bogs or "muck and swamp lands" is due to the fact that bog toxins or poisons exist in bog water and that therefore such lands even after being drained and supplied with fertilizers do not give satisfaction. Moreover xerophily (dry climate characters) of bog plants is not entirely caused by the acidity of peaty soil, by the lack of oxygen, or by low temperature, but in part results from these injurious substances.

When wheat plants were grown in untreated bog water, he found upon the roots numerous coloured bodies, which were apparently formed by the oxidizing substances given off by the roots. But as the root tips were decayed, it was clear that the roots were unable to overcome the bog toxins.

If bog water is treated with some absorbing substance, the result is invariably beniefical especially if the latter material is fine-grained. Humus and carborundum are about four times as absorptive as quartz, so that humus has great capacity for retaining the poisonous materials.

G. F. S.-E.

Bordeaux Mixture. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Eighth Report*, 1908, pp. 5–14).—When made in the ordinary way by adding milk of lime to copper sulphate a double basic sulphate of copper and calcium is formed, and it does not possess fungicidal properties until the action of the carbonic acid of the air has formed carbonates and sulphates of the metals, and the re-formation of the sulphate of copper does not begin until all the basic calcium sulphate has been converted into carbonate, thus explaining the lapse of time before Bordeaux mixture begins to be effective. This is often a great disadvantage, and it can be obviated by using only just sufficient lime to precipitate all the copper in the first instance, no basic calcium sulphate being then contained in the precipitate. As lime dissolves in water to the right extent to make a Bordeaux mixture of very nearly normal strength clear lime-water should be used instead of milk of lime. To make 100 gallons of wash 6 lb. 6½ oz. of copper sulphate are dissolved in water in a wooden vessel, and to it are added 86 gallons of clear lime-water, the whole being made up to 100 gallons by the addition of soft water. The lime-water is obtained by putting about 5 lb. of good quick-lime in 120 gallons of soft water, which, after being stirred several times, is allowed to settle. It is most important that the mixture should be tested to make sure that all the copper has been precipitated, and this is best done by putting a few drops of a solution of potassium ferrocyanide in a white saucer containing some water and dropping into it some of the clear liquid obtained after the Bordeaux mixture has settled, any brown or red coloration indicating copper in solution, a danger to be rectified by the addition of a little more lime-water, after which the test should be repeated, bearing in mind that any excess of lime above the minimum required weakens the mixture and represents direct loss of money, the excess to lime being no preventive of scorching, but possibly even the cause of if (p. 103). The stain produced on a steel knife is not a safe enough test. This method of preparation reduces the cost of Bordeaux mixture by three-fifths without in any way diminishing its effectiveness. An appendix to this Report contains a paper by Mr. Pickering on "The Chemistry of Bordeaux Mixture."—*A. P.*

Bordeaux Mixture. By C. S. Crandall (*U.S.A. Exp. Stn., Illinois, Bull.* No. 135). –An account of laboratory and field experiments to elucidate the manner in which soluble copper is liberated from Bordeaux mixture, and to investigate the causes of injury due to Bordeaux mixture. The history and preparation of the mixture are given, with the various opinions held as to its chemical nature and fungicidal action.

Bordeaux injury occurs in two forms—brown spots and margins of the leaves, and yellowing of the leaves with their subsequent fall. Their appearance is very irregular, especially the latter form, and is not always due to Bordeaux mixture. Browning of the leaves was produced by spraying with dilute copper sulphate solutions and by their injection into the stem. Yellowing, except in one case, was not produced by these means.

Sprayed trees showed slightly more injury when exposed to the weather than when protected from rain and dew. Great injury resulted from the use of air-slaked lime in making the mixture.

The report contains an elaborate series of analyses of drip-water from sprayed trees. Soluble copper was found in this water seven days after spraying, and continued to be present throughout the season.

The amount of free lime (alkalinity) diminished day by day. In about one month there was no alkaline reaction. The presence of this free lime did not prevent the solution of the copper. Rain and dew were more effective in liberating the copper than artificially applied water.

The former caused more injury. The application of milk of lime to sprayed trees did not prevent the liberation of copper.

The application of milk of lime alone to the leaves caused no injury, but a noticeable increase in the size of the leaves resulted. There are several illustrations of the apparatus used in the field.—*C. H. H.*

Bordeaux Spraying. By Spencer U. Pickering, F.R.S. (*Jour. Agr. Sci.* iii. (1908), p. 171).—The author recently investigated the composition of Bordeaux mixture and in the present communication describes the changes which take place during its use.

When lime is added to copper sulphate different basic sulphates are formed, and these when sprayed on to foliage are decomposed by the carbonic-acid gas of the air and form copper carbonate and some copper sulphate, and to the formation of these the fungicidal power of the spray is due. When lime is added in the form of lime water in just sufficient quantities to precipitate the copper, a basic sulphate is produced which, on decomposition, reproduces 25 per cent. of the copper sulphate taken, but if the mixture has sufficient lime to render the mixture slightly alkaline, a different basic sulphate, capable of reproducing only 10 per cent. of the copper sulphate, is produced. When made in the ordinary way (indeed, when the proportion of lime amounts to from 1·2 to 5 CaO for each $CuSO_4$ taken) the same amount of copper sulphate will be reproduced, but delay occurs owing to the excess lime having to be converted into carbonate first.

Later experiments, however, show that much more copper sulphate than 25 per cent. is recoverable from Bordeaux mixture made with lime water (the "Woburn Bordeaux," long used in Italy) owing to secondary reactions bringing the amount recovered up to 40 per cent., while in the case of ordinary Bordeaux mixture the usual 10 per cent. is not exceeded through secondary reactions.

Dried Bordeaux mixture differs in chemical composition from that made in the ordinary way or with lime water, and is considered much less efficient than the latter.

The addition of treacle to the "Woburn Bordeaux" may perhaps increase the rapidity with which the fungicidal copper sulphate is set free, but with ordinary Bordeaux mixture the treacle must necessarily have a detrimental effect.

Where it is desired to use soda Bordeaux mixture, on account of the less tendency to scorch foliage, the proportion in which it should be used is 1·84 part of crystallized carbonate (ordinary washing soda) to each part of copper sulphate. Its fungicidal action appears to be small, and what it possesses seems to be due to the soluble copper which exists for a short time (soon to be converted into malachite) in the mixture.

F. J. C.

Botanic Garden, Eastern Java. By M. Buysman (*Die Gart.* p. 570, November 27, 1909).—The greatest hindrance against acclimatizing plants from other countries is the exceptional humidity, or rather the heavy, lasting rain showers. Rain falls daily from the middle of November till June or July, and the remaining months of the year cannot be called dry. No plant ever dies from being too dry, but many suffer from being too wet, and others live but a short time. Such plants as Thistles and Cistus die promptly. Irises never flower, although they exist. Agaves and Cactaceous plants, again, grow splendidly and attain enormous sizes. Eschscholzias, Zinnias, and Dahlias once sown become simply weeds. *Cytisus Laburnum* and *Paulownia imperialis* only grow if sheltered from rain by roofing. Some Palms exist only, some grow better, but rarely bear fruit. Strawberries grow and fruit fairly well, especially when roofed over. Violets (*Viola odorata*) grow and flower uninterruptedly the whole year round. Tulips and Daffodils never flower, but they grow tremendously and have an abundance of foliage. Olea and *Syringa vulgaris* forms (Lilacs) never flower. Many plants from the dry Australian regions, such as some of the Acacias, grow most luxuriantly and flower and seed. *Papaver nudicaule*, from the Arctic zone, flowers from one end of the year till the other.—*G. R.*

Brooms for the Rock Garden. By W. D. (*Garden*, May 8, 1909, p. 226).—Dwarf varieties, *Cytisus kewensis* (fig. p. 228), *C. Beanii*, *C. Ardoinei*, *C. purpureus*, *C. procumbens*, *C. versicolor* and *Genista hispanica*, *G. pilosa*, *G. sagittalis*, and *G. tinctoria fl. pl.* are suggested, and methods of treatment are given.—*H. R. D.*

Budsports and Teratology. By R. G. Leavitt (*Bot. Gaz.* vol. xlvii. (1909), No. 1, pp. 30-68, with 19 figs.).—The author after first characterizing teratology as "a descriptive cult without unifying principles, heretofore pursued chiefly by the vaguely curious, and lending itself discreditably with equal readiness to either side of many a morphological discussion in the past," proceeds to show that many of its facts are of "special and high value."

The paper deals with the many cases of the transference of characters which normally belong to one stage in development or to one part of the plant into a quite different stage or different part of it.

Thus, for example, the leaflet scars of the Horse-chestnut are precisely similar to the leaf-scar at the base of the petiole (see the well-known illustration in Kerner's "Natural History"). The pinnæ of the "Pierson Fern" resemble in shape and in circinnate vernation the front of the "Boston Fern," of which it is a sport, and the pinnæ of the "Whitman Fern" is also very like the front of the Pierson fern (of which it is the budsport of a sport). Many similar cases are described from the genus Polystichum, &c. Many other examples are given, such as the three-spurred form of *Platanthera viridis*; acropetal changes, such as the corolla fringe of *Gentiana crinita* being transferred to the summit of the carpels; and basipetal transference, as when petaloid and sepaloid characters appear on the foliage. The stigmata of certain Crocus hybrids, for instance, may be found upon the apices of some of the leaves.

Transference of this kind may affect organs which are not homologous, for ovules may be replaced by a foliage leaf or a droseraceous tentacle; apogamous prothallia may also imitate the sporophyte directly, showing that such transference is not confined to one alternating generation.

Such transference or homoeotic metamorphosis is often determined by the nature of the nearest normal organ, as when the two sepals of a Cattleya come to resemble the normal labellum in colour and crisped margins.

In Gleditschia, pinnæ may become compound so as closely to resemble a normal leaf.

The author shows that such cases discredit abnormalities as tending to reveal the original ancestral form of any character. In some cases a transference of this kind has played a part in the evolution of plants. In *Habenaria quinquesecta*, for instance, a stem apex is regularly organized at the base of certain roots close to the *punctum vegetationis*, and vegetative reproduction is carried on by these roots. In the Mexican species of *Phyllonoma* flowers are regularly produced from the upper surface of the leaves near the apex. The author considers that the embryos due to nucellus buds in Opuntia and the buds of the inner integument which develop into embryos in the case of *Spiranthes cernua* (lowland form) are also due to a similar transference.

This transference of characters, or homoeosis, is shown to seriously affect not only the idea of mutation but the Roux-Weismann theory, and will need to be provided for in our ultimate theory of development.

G. F. S.-E.

Bulbophyllum campanulatum. By R. A. Rolfe (*Bot. Mag.* tab. 8281).—Nat. ord. *Orchidaceae*; tribe *Epidendreae.* Sumatra. Epiphytic herb; leaves 3–3½ inches long; scapes slender, 3 inches long, 10-flowered; flowers, umbellate, ¾ inch long, pink.—*G. H.*

Caragana, Monograph on the Genus (*Jour. Soc. Nat. Hort. Fr.*, May 1909).—An account of a monograph by M. V. L. Komarov on the genus Caragana, giving a complete list of its species and their varieties, illustrated by full-page plates.—*M. L. H.*

Caralluma Nebrownii. By N. E. Brown (*Bot. Mag.* tab. 8267).—Nat. ord. *Asclepiadaceae*; tribe *Cecropegieae.* German S.W. Africa. Herb; stems succulent, leafless, 4-angled, angles toothed; corolla rotate, 3½–4½ inches across, reddish-purple outside, deep blackish-crimson within.—*G. H.*

Carnation alternariose (*Bot. Gaz.* vol. xlvii., No. 5, May 1909, pp. 409–413; with 2 figs.).—This disease is diagnosed by dry, nearly circular, ashy white spots on leaves or stems, with a black fungus growth in the centre. When it occurs at the nodes, the disease penetrates through the stem, killing its tissue, and results in the death "of the more distal portions of the plant." It especially affects the "Mrs. Thomas W. Lawson" variety. It is due to a fungus which is here described and figured by Messrs. Stevens and Hall, viz. *Alternaria Dianthi*, and which occurred at Raleigh, North Carolina.—*G. F. S.-E.*

Castilleja, New Species of (*Bot. Gaz.* vol. xlviii., No. 2, pp. 146–148, August 1909).—Mr. T. N. Greenman describes three new species of Castilleja from the Wallowa Mountains, Oregon, collected by Mr. W. C. Cusick.—*G. F. S.-E.*

Cephalotaxus drupacea. By W. B. Hemsley (*Bot. Mag.* tab. 8285).—Nat. ord. *Coniferae*; tribe *Taxeae*; China and Japan. Tree, diœcious, 10–35 feet high; leaves yew-like, male infloresence globular, 1½–2 lines wide; female flowers solitary; seed ovoid, 1¼ inch long, outer coat thick and fleshy, brown.—*G. H.*

Cereus amecamensis. By N. E. Brown (*Bot. Mag.* tab. 8277).—Nat. ord. *Cactaceae*. Mexico. Herb with succulent stems, branching from the base, 3–5-angled, ¾–1¼ inch thick, pale green; flowers white, 6–7 inches across.—*G. H.*

Chenopodium amaranticolor. By D. Bois (*Le Jard.*, vol. xxiii. No. 531, p. 103).—A plea for a new vegetable, as a substitute for Spinach. It was discovered thirty years ago in a semi-wild state near Marseilles, and is at its best during the summer, when spinach has seeded. Unfortunately it requires a warm climate, and only flourishes south of the Loire, but it might be forced in this country.—*F. A. W.*

Cherry Fruit Fly. By M. Houssy (*Le Jard.*, vol. xxiii. No. 534, p. 151; May 20, 1909).—By the ingenious contrivance of breathing through two apertures at the lower end of its body this larva is able to bury itself without being suffocated in the juicy part of a cherry, the head being armed with a hook, by which it tears up the pulp before absorbing it. The fruit thus attacked becomes soft and squashy, and falls off. The only known way of combating this pest is to pick the cherries up and burn them, or to feed chickens at the roots of the trees, where the insects pupate and bury themselves in the ground for the autumn and winter. In May the shining black and yellow fly emerges, and lays its eggs on the young fruit.—*F. A. W.*

Cherry Leaf Scorch, *Gnomonia erythrostoma.* By T. W. Kirk, F.L.S., and A. H. Cockayne (*Dep. Agr., N.Z., Leaflet* No. 51).—This leaflet deals with the pest which is known in Europe on cherry leaves, and has appeared at Taranaki. The remedial measures suggested are burning diseased leaves and spraying the young growth with Bordeaux mixture.—*M. C. C.*

Cherry, New. By W. A. Taylor (*U.S.A. Dept. Agr. Year Book*, 1907, p. 307; plate).—*Lambert*, a new cherry reputed to have arisen from a cross between Black Heart and Napoleon.—*E. A. Bd.*

Chrysanthemums (*Le Jard.*, vol. xxiii. No. 533, p. 137; May 5, 1909).—The official list issued by the Soc. Nat. de Hort. de France, Section des Chrysanthèmes, of the best varieties of Chrysanthemums, in thirteen groups.—*F. A. W.*

Cider-making. By J. Knight (*Jour. Dep. Agr. Vict.*; June 1909, pp. 347–367).—Deals with the composition of the various Victorian grown apples tested for cider-making, as to percentage of juice, specific gravity, possible alcohol and acidity. Cider mills, racks, etc., are illustrated.

Fermentation, artificial ferments, clarifying, filtering, pasteurizing, non-alcoholic cider. Sulphurizing. Treatment of casks, diffusion in cider making, storing or bottling.—*C. H. H.*

Ciders, The Yeast Flora of Bottled. By E. B. Pearce and B. T. P. Barker (*Jour. Agr. Sci.* iii. p. 55 ; December 1908 ; plates).—An investigation into the occurrence of various yeasts in bottled ciders is reported, including a description of the methods of investigation adopted and descriptions of the species isolated (thirteen in all). The floras of the samples examined were so diverse that it is suggested that "uniformity in the character of the product cannot be looked for under the old system" (of depending upon chance infection by yeasts), "and that at times the quality [of the cider] is certain to fall short of that which might have been obtained, if a selected yeast had been used to dominate the fermentation."—*F. J. C.*

Cissus adenopodus. By T. A. Sprague (*Bot. Mag.* tab. 8278).—Nat. ord. *Ampelidaceae.* Uganda. Herb, climbing by tendrils ; leaves 3-foliolate, leaflets, ovate, acuminate, 2–4 inches long, green above, red below ; panicles triangular in outline, about 4 inches long ; flowers $\frac{3}{16}$ inch long.—*G. H.*

Clematis, Rare and Beautiful Varieties. By W. D. (*Garden,* June 19, 1909, p. 302).—The writer draws attention to some of the species and varieties easily grown, but seldom seen in gardens. He states that *C. Durandi* and its variety *pallida* are very free-flowering and robust. At Kew they are grown in a bed in the open and allowed to trail over oak branches. A good-sized mass of *C. montana rubens* there growing over rough posts makes a fine effect. The plants have been propagated from cuttings. *C. orientalis tangutica,* the best yellow, comes true from seed. *C. Flammula rubro marginata, C. campaniflora,* and *C. grata* are all mentioned as strong and free-flowering ; the last is an Himalayan shrub, flowering in August and September. Hybrids of *C. heracleaefolia* raised by M. Lemoine are specially recommended.—*H. R. D.*

Clianthus Dampieri, Grafting of. By K. Meyer (*Die Gart.* p. 473, October 2, 1909).—Most gardeners know that *Clianthus Dampieri* will grow more vigorously, flower more freely and for a longer period, and be less liable to die off in cool or wet summers if the young seedlings are grafted on such allied plants as *C. puniceus,* which must be quite young and raised at about the same time as *C. Dampieri.* The author recommends also seedlings of that common shrub *Colutea arborescens* as stock for grafting, as the plant is then much more robust than if grafted on *C. puniceus.*—*G. R.*

Codlin Moth. By A. L. Quaintance (*U.S.A. Dept. Agr. Year Book,* 1907, pp. 435–450 ; plate).—A lengthy account of this pest. It is computed that some $15,000,000 must be charged to its presence in the United States, $3,000,000 of which is spent in spraying.

A parasite, *Calliephialtes messor* Grav., has been introduced from Europe to try and keep it in check by natural means. A list of birds is given which prey upon the larvæ. Arsenite of lime is recommended as the cheapest arsenical wash, and is stated to have proved entirely satisfactory.—*E. A. Bd.*

Codlin Moth, Arsenic for. By E. Durand (*Pom. Franc.* August 1909, pp. 238–243).—Trees should be banded with thick muslin from middle of June, and these bands should be frequently examined to catch the caterpillars about to change into chrysalides. Spraying was done with a knapsack pump, using a ladder, the face being covered with a wire mask. In the variety 'Reinette gris d'hiver,' out of trees with 800 to 1,000 apples, on the sprayed trees only 4 per cent. were worm-eaten, whilst on similar trees unsprayed 32 per cent. were worm-eaten. On analysing the sprayed fruit $\frac{1}{80}$th of a milligram of arsenic per kilogram of fruit was found, on fruit sprayed whilst in flower $\frac{1}{45}$th of a milligram per kilogram fruit, negligible quantities. On the leaves at the fall of the leaf six milligrams arsenic per kilogram of collected dry leaves was found.—*C. H. H.*

Coelogyne venusta. By R. A. Rolfe (*Bot. Mag.* tab. 8262).—Nat. ord. *Orchidaceae*; tribe *Epidendreae*. Yunnan. Epiphytic herb; leaves 5–7 inches long; scapes many-flowered; flowers pale yellow, lip white with yellow centre.—*G. H.*

Colorado Beetle, Western Spread of. By J. W. Aldrich (*Jour. Econ. Entom.* ii. (1909), 3, p. 235.)—This insect spread on the introduction of the potato from the east side of the Rocky Mountains, where it is native, and feeds on *Solanum rostratum*, to the Atlantic seaboard in fifteen years, but has scarcely spread westwards in spite of the occurrence of numberless opportunities.—*F. J. C.*

Colouring Matter of the Flowers of Hisbiscus sabdariffa. By Arthur George Perkins (*Jour. Chem. Soc.* vol. 95, pp. 1855–9; Nov. 1909).—This shrub is the Red Sorrel of the West Indies and is cultivated in India and Ceylon, the fleshy red calyx being used for food and the stems supplying the "Roselle hemp" of commerce. The yellow flowers, which are just capable of dyeing yellow, are not used for the purpose, but in some districts the red calyces are so employed.

The investigation was carried out upon the flower-heads, including stalk, calyx, corolla, &c., and the colouring matter, when isolated, was found to be "gossypetin," a substance found in the flowers of the Indian cotton plant (*Gossypium herbaceum*), accompanied by very small quantities of an apparently unknown colouring matter for which the author proposes the name "Hibercetin," and which he purposes more fully investigating when larger supplies of material are obtained.

He also found protocatechuic acid, which he believes had existed in the fresh flowers as proto-catechu-aldehyde, a substance to which the perfume of many flowers is known to be due.—*W. A. V.*

Colouring Matter of the Flowers of Thespasia lampas. By Arthur George Perkin (*Jour. Chem. Soc.* vol. 95, pp. 1859–60).—This small bush is indigenous in India, Burma, and Ceylon. From the yellow sepals a yellow colouring matter was isolated and found to consist of the glucoside "quercetin," the yield being rather over half per cent. The capsules and flowers of *T. populnea* were already known to yield a yellow dye. As in the case of *Hibiscus sabdariffa* investigated by the same author (see abstract) proto-catechu-aldehyde had apparently been present in the fresh flowers as a perfume.—*W. A. V.*

Conifers. On the Distribution of, in the Several Districts of China. By the late Maxwell T. Masters, F.R.S. (*Journ. Linn. Soc.* Vol. xxxviii. No. 265, pp. 198-205; 1908).—The total number of Conifers known from China, inclusive of Formosa, amounts to eighty-seven distributed through twenty-three genera. Speaking generally, a marked difference may be noted in the Coniferous floras of Northern, Southern, Central, and Western China respectively. The relationship between the Conifers of the different Chinese provinces to those of surrounding countries is then indicated. The paper contains two tables. Table 1 shows the distribution of the genera of Conifers in China and Japan. Table 2 gives a list of all the species of Conifers known to be native of China and shows their distribution in the various districts of the empire and in neighbouring countries.—*R. B.*

Copernicia macroglossa. By A. Malmquist (*Die Gart.* p. 555, November 29, 1909).—Although not a new plant this palm is rarely represented in collections. It was introduced from Cuba by Señor Ramon de la Sagra in 1829. In general habit it resembles a *Corypha*. It forms one of the best growing specimens in the world-famed collection at Herrenhausen, near Hanover.—*G. R.*

Cornus macrophylla. By W. B. Hemsley (*Bot. Mag.* tab. 8261).—Nat. ord. *Cornaceae.* Eastern Asia. Tree, 15-50 feet high; leaves 4-6 inches long; flowers 4-merous, yellowish-white, in compound, cymes, 2½-5 inches across; drupes globose, purple.—*G. H.*

Cotoneaster moupinensis forma **floribunda.** By O. Stapf (*Bot. Mag.* tab. 8284).—Nat. ord. *Rosaceae*; tribe *Pomeae*; W. China. Shrub; leaves ovate, 2-3 inches long, yellowish or grey below; corymbs, 20-30-flowered, corolla reddish outside, under 2 lines long; berries red.—*G. H.*

Cotton, Experiments with Egyptian, in 1908 (*U.S.A. Dep. Agr., Bur. Pl. Ind., Cir.* No. 29, April 1909).—An account of experiments in acclimatising Egyptian Cotton in the Colorado River region. It is shown that imported seed does not entirely flourish in its new quarters, but in time it is hoped that home-grown seed will be produced which shall be absolutely adapted to the new conditions and which will produce fibre of good quality. It is not recommended that the crop should be planted on any large scale at present, and great care is insisted on to exclude seed infected with the disease known as "black arm," which once introduced would kill a rising industry in that district.—*M. L. H.*

Cotton: Flower Bud Maggot. By H. A. Ballou, M.Sc. (*Journ. Imp. Dep. Agr. W.I.*, vol. x. No. 1, 1909; with 9 figs.).—The flower bud maggot is a minute insect, the larva of a small fly, *Contarinia gossypii*

The flower buds are attacked, the eggs being deposited in the bud by the fly. The bud usually falls whilst quite young.

This insect has caused serious loss to cotton-growers in Antigua. It is directly influenced by the weather—damp weather being particularly favourable. No suitable remedies have been discovered thus far.

M. C. C.

Cucurbitaceae, Fruits and Seeds of (*Bot. Gaz.* vol. xlvii., No. 4, pp. 263–310, April 1909; with 53 figs.).—Miss Kate G. Barber gives a short sketch of the distribution of Cucurbitaceae and describes, with figures, the anatomy of the fruits and seeds of various species of Cucurbita, Cucumis, Citrullus, Sicyos, Echinocystis, Luffa, Abobra, Melothria and Trichosanthes. The figures are well worth close examination on account of the interesting variety of the cell shapes, especially in the epidermal, subepidermal and sclerenchymatous layers. The descriptions are very complete and clear.

G. F. S.-E.

Cycads, Spermatogenesis of (*Bot. Gaz.* vol. xlvii., No. 3. pp. 215–236, March 1909; with 3 figs. and 4 plates).—The stamens of *Dioon edule* (according to Professor Charles J. Chamberlain) are rather large and bear about 250 sporangia with about 30,000 spores in each. There are twelve chromosomes in the pollen mother cell. There is only one prothallial cell. Blepharoplasts are of nuclear origin. Sperms are discharged from sperm mother cells. The nucleus and cytoplasm show a vigorous amœboid movement.

There is also the usual movement by cilia.—*G. F. S.-E.*

Cycnoches densiflorum. By R. A. Rolfe (*Bot. Mag.* tab. 8268).—Nat. ord. *Orchidaceae*; tribe *Vandeae.* Colombia. Leaves oblong-lanceolate, 5–7 inches long; flowers monœcious; male racemes pendulous, many and dense-flowered, greenish-yellow, spotted with purple; female racemes 2-flowered; flowers almost fleshy, 3 inches across, green except pale yellow lip.—*G. H.*

Cyclamen, Sweet-Scented. By J. T. Stang (*Garden*, April 10, 1909, p. 179).—The writer quotes from a magazine reference in the year 1849 to sweet-scented cyclamen, and describes attempts to recover the lost fragrance. He accidentally picked up a sweet-scented plant at a village inn, and has had success with white varieties having a pink or rose base, with a giant white and a bright claret, but not with salmon or dark coloured flowers.—*H. R. D.*

Dahlia, Summer-flowering. By B. T. Galloway (*U.S.A. Dept. Agr. Year Book*, 1907, p. 114; 1 plate).—An account of the production of a summer-flowering Dahlia. The seed-bearing parent was discovered in Mexico in 1904 at an elevation of 7,000 ft. This crossed with ordinary forms gave some twenty new varieties, which commence to flower in early July. Only three colours—crimson, scarlet, and yellow in various shades—have yet appeared. Seed is freely set upon the hybrid plants, and the name 'Cosmos Dahlia' is suggested.—*E. A. Bd.*

Daphne Blagayana. By Thomas Smith (*Garden*, May 15, 1909, p. 241; fig.).—The writer suggests that the mistake usually made with regard to this plant is grafting it on *D. Mezereum*, and that when plants are purchased in this condition layering should be resorted to.—*H. R. D.*

Dendrobium Bronckartii. By R. A. Rolfe (*Bot. Mag.* tab. 8252).—Nat. ord. *Orchidaceae*; tribe *Epidendreae*. Indo-China. An epiphytic herb; 2–3 feet long; leaves 4–5 inches long, 1½–2½ wide; racemes lax, pendulous, many-flowered; flowers nearly 2 inches across, white, lip yellow with a white border.—*G. H.*

Deutzia setchuensis. By J. Hutchinson (*Bot. Mag.* tab. 8255).—Nat ord. *Saxifragaceae*; tribe *Hydrangeae*; China. An undershrub; leaves lanceolate, 2–4 inches long, 1¼ inch wide, papery; inflorescence corymbose, many-flowered; flowers, white, ⅜ inch across.—*G. H.*

Diseases of Coco-nuts in the West Indies. By F. A. Stockdale, B.A., F.L.S. (*Journ. Imp. Dep. Agr. W.I.*, vol. ix. No. 4, 1909).—Three forms of disease are recognized, viz.:

Root Disease, presumed to be caused by a species of *Botryodiplodia*;

Leaf Disease, attributed to *Pestalozzia palmarum* (Cooke); and

Bud Rot Disease, associated with bacteria, but subject to further investigation.—*M. C. C.*

Diseases of Deciduous Forest Trees. By H. von Schrenk and P. Spaulding (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 149; June 1909, plates).—The principal diseases of deciduous forest trees in America are grouped under (1) environmental diseases; (2) those due to miscellaneous parasitic and saprophytic organisms; (3) those due to wound fungi; (4) sap rots; (5) decay of structural timber.

Under the first heading the effect of sulphur gases and smoke is considered and the common trees are placed in the following order, beginning with the most susceptible to injury and ending with the least: *Pinus Strobus*, *Tsuga* sp., *Pinus virginiana*, *P. rigida*, *Quercus Prinus*, *Hickoria* sp., *Quercus marilandica*, *Q. alba*, *Q. minor*, *Castanea dentata*, *Quercus digitata*, *Q. coccinea*, *Liriodendron tulipifera*, *Acer* sp., *Nyssa sylvatica*. The degree of discoloration of foliage due to fumes is also described. Unfavourable soil conditions and the symptoms such as "stag-headed" condition, etiolated foliage, etc., are dealt with at length. Injuries due to extreme cold and wind and animals are also included in "environmental diseases."

In the second group some parasitic flowering plants with their hosts are described, including mistletoe (*Phoradendron flavescens* (Pursh.) Nutt.), and others of similar habit like *Arceuthobium cryptopoda* Engel. and *A. pusillum* Peck. Some epiphytic plants, especially *Tillandsia usneoides* L. and *T. recurvata* L., as well as mosses and lichens, particularly when abundant, are credited with causing injurious results. Mildews, rusts, leaf-blights and spots, cankers, root rots, and slime-flux diseases are all included in this section.

The major portion of the Bulletin is devoted to "wound fungi"—fungi which gain an entrance into the tree through wounds, and which are by far the most important disease producers in deciduous trees. Those dealt with include *Fomes igniarius* (L.) Gillet, *Polyporus sulphureus* (Bull.) Fr., "piped rot" caused by an unidentified fungus, *Polyporus obtusus* Berk., *Fomes nigricans* Fr., *Hydnum erinaceus* Bull., *Fomes rimosus* Berk., *F. fraxinophilus* Peck, *F. fulvus* Fr., *Polystictus versicolor* Fr., *Fomes Everhartii* Ell. and Gall., *Polyporus squamosus* Huds., *P. betulinus* (Bull.) Fr., and *Fomes fomentarius* (L.) Fr.

Sap rots are described caused by *Polystictus pergamenus* Fr., *Fomes applanatus* (Pers.) Wallr. (= *Elfvingia megaloma* (Lév.) Murrill), *Stereum frustulosum* (Pers.) Fr., *Daedalea quercina* (L.) Pers.; while the following are briefly alluded to: *Polystictus hirsutus* Fr., *P. sanguineus* (L.) Mey., *P. cinnabarinus* (Jacq.) Fr., *Poria subacida* Peck., *P. vaporaria* Fr., *Polyporus betulinus* (Bull.) Fr., *P. gilvus* Schwein., *P. adustus* (Willd.) Fr., *Lenzites corrugata* Klotzsch, *L. vialis* Peck., and *L. betulina* (L.) Fr.

In each case a careful and accurate description of the diseases due to the different fungi is given, with notes on their distribution and on the approved methods of dealing with them.

The last part deals with the decay of cut timber.

A bibliography with 114 numbers, a series of 10 plates, and an excellent index complete a useful review of diseases of deciduous trees.

F. J. C.

Diseases of Ornamental Trees. By Haven Metcalf (*U.S.A. Dept. Agr. Year Book*, 1907, pp. 483–494).—A consideration of the diseases of ornamental trees, and also the results of root suffocation, gas-poisoning, &c., in town-planted trees. The possibilities of healing large wounds ("Tree Surgery") is also dealt with.—*E. A. Bd.*

Dry-Rot in Potatos. By Miss S. Longman (*Jour. Linn. Soc.* Vol. xxxix. No. 270, pp. 120–129; 1909. Plate 10).—*Fusarium Solani* causes the disease known as dry-rot. It is a true parasite attacking not only the resting tuber but also the underground parts of the growing potato plant. It appears on the surface of the potato either in white patches (often covering wounds) or else in the form of small pustules breaking through the skin at the place where it first wrinkled. The earliest outward sign of the disease is the wrinkling of the skin as the potato shrinks. The internal alterations of the tuber are described. It has been thought that dry-rot is always preceded by wet-rot, but this was found not to be the case; dry-rot may follow wet-rot but it may also affect previously healthy tubers. A description is given of the different forms of spore produced by this fungus. A reduced pycindial stage was observed but Massee's ascus-stage was not met with. The colour phases of the mycelium and spores appear to be associated with stages in the life-history of the fungus and not, as Smith and Swingle suggest, with the nature of the culture-medium. Sterilization of the diseased potato-tubers is not possible, since the death-temperature of the fungus is higher than that of the potato.—*R. B.*

Emulsions. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Eighth Report*, 1908, pp. 18–32).—An investigation on the nature of emulsions has led to the conclusion that emulsification of oil in water depends on the presence of minute solid particles which arrange themselves round the oil globules, enclosing them in a sort of skin and thus preventing them from coming into contact with each other and coalescing. In the case of soap, so commonly used as an emulsifying agent, the solid particles are formed locally and temporarily in the neighbourhood of the oil gobules, owing to the soap being insoluble in the oil. The want of actual insolubility in such cases accounts for the frequent occurrence of spontaneous de-emulsification, which forms a drawback to the use of soap as an emulsifier. This apparently never occurs when the emulsifier is permanently insoluble. Various substances precipitated from solutions have been found to act as emulsifiers, among the best being basic sulphates of copper and iron. It is only necessary to add a little lime to a solution of sulphate of copper or sulphate of iron to obtain a precipitate of the basic sulphates, and when paraffin is churned up with these it immediately forms a bulky and fine-grained emulsion, which is quite permanent, and perfect for spraying purposes. A great advantage of the use of such emulsifiers is that various substances may be mixed with the emulsion, notably caustic soda, without producing de-emulsification, thus removing the one serious drawback to the Woburn wash. When sulphate of copper is used as the emulsifier the wash will have fungicidal properties, and will, as a matter of fact, contain Bordeaux mixture; but if no such properties are required the cheaper sulphate of iron may be used. Emulsification with these basic sulphates is much more satisfactory when the paraffin is a high-boiling oil, such as solar distillate, which is half the price of burning oil and can be sent by rail without being charged as an explosive. Directions are given for the making of caustic winter washes with copper and iron sulphates, and a summer wash (without caustic soda), as instances of the way in which paraffin can be emulsified with almost any insecticide or fungicide by making use of precipitated solids as emulsifiers. The chemical student will find in the appendix to this report papers by Mr. Pickering on the "Interaction of Metallic Sulphates and Caustic Alkalies" and "Emulsions."—*A. P.*

Entomophagous Parasites. By (*a*) C. Arranger, (*b*) C. Doublesel (*Le Jard.* vol. xxiii. No. 540, p. 245; August 20, 1909; 5 figs.).—A plea for the protection and encouragement of the larvae which prey upon various caterpillars, as already indicated on the note by the same author on *Tachinae*. The article is well worth the consideration of horticulturists.—*F. A. W.*

Erlangea tomentosa. By J. Hutchinson (*Bot. Mag.* tab. 8269).—Nat. ord. *Compositae*; tribe *Vernonieae*. Trop. E. Africa. Shrub, 5 feet high; leaves oblong, 2–5 inches long, doubly serrate, pubescent above, villous-tomentose below; heads lilac, on a branching panicle, 6 inches across.—*G. H.*

Euphorbia Ledienii. By N. E. Brown (*Bot. Mag.* tab. 8275).—Nat. ord. *Euphorbiaceae*; tribe *Euphorbieae*. S. Africa. Shrub, succulent, branching, 3 feet high; branches, 5-7 angled; spines in pairs; cymes bearing 3 involucres, several in each axil, yellow.—*G. H.*

European Currant Rust on the White Pine in America. By Perley Spaulding (*U.S.A. Dep. Agr., Circular No. 38*; August 1909).—The fungus *Peridermium Strobi* (Kleb.), now known to be a stage of the blister rust of currants, known as *Cronartium ribicola*, has made its appearance on imported trees of *Pinus Strobus* in the United States, and efforts are being made to control the importation and eradicate the diseased plants.—*M. C. C.*

Euryops virgineus. By J. Hutchinson (*Bot. Mag.* tab. 8291).—Nat. ord. *Compositae*; tribe *Senecionideae*; S. Africa. Shrub 1-2 feet high; fastigiately branched; leaves 3-5 lines long; heads solitary, axillary, ¾ inch across, yellow.—*G. H.*

Exostemma subcordatum. By J. Hutchinson (*Bot. Mag.* tab. 8274).—Nat. ord. *Rubiaceae*; tribe *Cinchoneae*. W. Indies. Shrub, 8 feet high; leaves ovate, 2-5 inches long; inflorescence terminal, subcorymbose; corolla white, fragrant, tube ½-¾ inch long, lobes linear, 1 inch long, recurved.—*G. H.*

Fiji, A Contribution to the Montane Flora of. By Lilian S. Gibbs, F.L.S. (*Jour. Linn. Soc.* Vol. xxxix. Nos. 270 and 271, pp. 130-212; 1909. Plates 11-16 and text figs.)—This collection was made during August, September and October in the island of Viti Levu at altitudes above 2700 ft. Forty new species and seven new records, comprising seven genera not previously recorded for the islands, were included among the plants found. The present collection confirms the Indo-Malayan character of the Fijian Flora, and at the same time emphasizes its relationship to the islands to the east, viz. Samoa and Tonga, and to a less extent, Tahiti. The paper concludes with an interesting sketch of the plant associations in the vicinity of Nadarivatu (the centre from which the collections were made.)—*R. B.*

Fokien, A Botanical Expedition to Central. By S. T. Dunn, B.A., F.L.S. (*Jour. Linn. Soc.* Vol. xxxviii. No. 267, pp. 350-373; 1908).—The Province of Fokien, in which the collection was made, lies on the coast of China just to the north of the tropics, half way between Hong Kong and Shanghai. It covers an area about equal to that of England and Wales combined. The collection contains upwards of 1443 distinguishable species; among these are included at least forty new species, and numerous other interesting plants, some of which are additional to the flora of the province, and even, in some cases, to that of China. An enumeration and description of all the novelties so far identified (with the exception of the Hamamelidaceae) then follows.—*R. B.*

Forced Bulbs and Eel Worms. By J. D. Pearson (*Garden*, March 20, 1909, p. 138).—The failure of Hyacinths, Tulips and Narcissi in pots was traced to eelworms which were found in the turf used for potting. The worms tunnel into the roots, leaving the skin to decay.

They are very difficult to detect, being only about the thickness of a human hair, and from ⅛ to ¼ inch long, nearly white in colour; but they may be discovered by their wriggling when exposed to light. The use of a large hand glass is recommended. As a remedy Vaporite was tried, but, though it killed other pests, the eel worms "seemed rather to like it than otherwise." The writer suggests that those who have been troubled in this way should use garden soil in place of turf. Fibre was also found satisfactory. A. J. Hawkes (*Garden*, April 10, 1909, p. 178) found Malmaison Carnations suffering from the same trouble, and states that he tried Vaporite with success. On the other hand C. J. (*same reference*) found that Vaporite would destroy wire worms but not eel worms, and that the only means of killing the latter was to heat the soil with red hot bricks before potting. W. Hall (same reference) states that he has obtained good results with Apterite.—*H. R. D.*

Forsythia. By E. Rouhaud (*Le Jardin*, vol. xxiii. No. 531, p. 104; April 5, 1909; coloured plate). The genus *Forsythia* may conveniently be described as consisting of three species, one hybrid, and three varieties. The species are *Forsythia europaea* Degen and Baldacci, *F. suspensa* Vahl, *F. viridissima* Lindl.; hybrid, *F. intermedia* Zab.; varieties *F. intermedia* var. *Fortunei*, *F. intermedia* var. *pyramidalis*, *F. viridissima foliis variegatis*. M. Rouhaud gives the characteristics of each of these and general directions for culture.—*F. A. W.*

Frosts, Spring, the Best Means to Combat Them. By L. Treyve and T. Baboud (*Pom. Franç.*, May 1909, pp. 136–139).—Describes black and white frosts. It is almost impossible to combat the ravages of the first, but against the latter some protection may be given to espaliers and cordon trees by lean-tos of glass, planks or battens on brackets against the wall, or straw hurdles. These shelters favour the development of the lower parts of the tree, and help thus to maintain the tree in equal growth in lower and upper branches.—*C. H. H.*

Fruit Cases, Standard Sized (*Journ. Dep. Agr. Vict.*, February 1909, p. 76, prescribed by the Fruit Cases Act 1906).—For local trade:—

1. Double or two-bushel cases: 26 × 12 × 14¼ inches (4,446 cubic) inside measurement and clear of divisions.

2. (*a*) Single or one bushel cases: 26 × 6 × 14¼ inches (2,223 cubic) inside measurement and clear of divisions; or

(*b*) 18 × 8⅞ × 14 inches (2,237 cubic) inside measurements, no divisions allowed.

3. (*a*) Half or half-bushel cases: 26 × 6 × 7⅛ inches (1,112 cubic) inside measurement and clear of all divisions; or

(*b*) 18 × 7 × 8⅞ inches (1,118) inside measurement, no divisions allowed.

For export trade:—See 2 (*a*) and 3 (*b*) above.—*C. H. H.*

Fruit for the Irish Market (*Journ. Soc. Nat. Hort. Fr.*, May 1909, p. 302).—Considerable quantities of apples and grapes are said to be already imported into Ireland from France, and suggestions are made for largely increasing this trade in the future.—*M. L. H.*

Fruits for Cultivation in the United States and Canada. By a Committee of the American Pomological Society (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 151; June 1909).—This is a comprehensive list of fruits, from hardy to tropical, recommended for cultivation under the varying conditions of this vast area. It is based upon the deliberate ratings of practical fruit-growers in the various pomological districts in response to some 2,000 inquiries sent out by the Bureau of Plant Industry. It is arranged in tabular form, showing the place of origin of the variety, its form, size, colour, flavour, quality, use, and season, with various recommendations for the eighteen districts into which these countries are divided for this purpose. It is undoubtedly a very useful and up-to-date publication for intending planters in the United States and Canada, but the authors point out that, owing to the extended range of the districts, it should not be relied upon to the exclusion of local knowledge and the experience of others in the vicinity.—*A. P.*

Fruits, Variation of. By Pierre Passy (*Jour. Soc. Nat. Hort. Fr.*, April 1909, p. 237).—This paper is a further attempt to discredit the recent theory of possible hybridization between stock and scion in grafted trees.

M. Passy argues that while the produce of the graft is undoubtedly influenced in several ways by the stock on which it is grafted, such influence is identical both in manner and direction with that exercised by soil and situation. He declares himself not justified, of course, in asserting that means may not be found of producing such hybridization, but is emphatic on the point that, fortunately for horticulturists, it never has taken place yet, and it is still possible to perpetuate varieties uninterruptedly by grafting.—*M. L. H.*

Fumigation of Nursery Stock. By J. L. Phillips (*Jour. Econ. Entom.*, ii. (1909), 4, p. 280).—Injury to nursery stock by fumigation with hydrocyanic acid gas has been reported. The author finds this is usually due to too tightly packing the trees in the fumigating house, and under these conditions it is not possible to reach all the trees, so as to completely destroy San José scale. The amount of material required for 100 cu. ft., the charge to remain an hour, is—

3 fluid oz. water.
1 fluid oz. commercial sulphuric acid (sp. gr. 1·83).
1 oz. fused potassium cyanide. *F. J. C.*

Fungi and Environment (*Bot. Gaz.* vol. xlviii. (1909), No. 1, pp. 1–30; with 37 figs.).—Messrs. Stevens and Hall find that important differences are produced in the growth of fungi by variations in the method of culture. The density factor (close or scattered sowing) affects both the size of the colony, the colour and formation of pycnidia. Zonal arrangement is due to the crowding of mycelia, and not to light or heat relations. The use of various chemicals in plate cultivations of eleven fungi affected the colours, size and separation of spores. Light has little or no effect upon the lineal growth of the three fungi tested, but inhibits pycnidial development and produces zonation of colonies.

The authors have also prepared eleven diagrams showing the variations in spore measurement. The coefficient of variation is as much as 26·781 ± ·503 in *Ascochyta Chrysanthemi* (smaller pycnidia) and also varies according to the medium in which the fungus is grown.

The facts observed by the writers have a very important bearing upon the classification and taxonomy of fungi. This is especially the case as regards "paired" species of the *Imperfecti* which grow upon the same host and only differ in one character (*e.g. Cylindrothecium* and *Septoria Chrysanthemi*). In some cases the essential descriptive characters of a fungus were altered without difficulty by changes in the substratum or other environmental factors, and the spores were also shown to vary so much in size as to make any use of their measurements in classification of very doubtful value. Thus for *Septoria Lycopersici* the mean on apple agar was 21·507 and on pure agar 31·675.—*G. F. S.-E.*

Fungus-like Appearance on Imported and Exported Apple Trees. By D. McAlpine (*Jour. Dep. Agr. Vict.*; July 1909).—Excessive development of lenticels on Northern Spy stock was mistaken for disease on trees exported from Victoria to the Transvaal.—*C. H. H.*

Fungus Poisoning. By H. H. Edwards (*Jour. Dep. Agr. Vict.*; March 1909, p. 157).—It has been observed that no hard-and-fast rule can be laid down as to which fungi are poisonous, and which are not: *e.g.* the common mushroom (the *Agaricus campestris*), an article of diet in England and Australia, is a deadly poison in Russia; and other species, which are eaten with impunity in Italy and Switzerland are known to produce poisonous effects when grown in England. Thus it seems that climatic and other influences have a great deal to do with the formation and elaboration of the poisonous principle, which is said to be of a volatile nature and soluble in water. Taylor describes the styptic astringent taste of poisonous fungi as being a narcotico-irritant poison. It is certain that if a fungus be grown in any other than its proper season, or in a dark place, the elaboration of the "fungin" will be increased and therefore the fungus should be looked upon with suspicion. Edwards records the poisoning of two cows after eating fifteen to twenty puff-balls (*Lycoperdon giganteum*).—*C. H. H.*

Gerbera Jamesonii hybrids. (i) By C. A., (ii) by R. Adnet (*Le Jard.*, vol. xxiii. No. 533, p. 136; May 5, 1909; 1 fig., coloured plate).—Gerbera is easily raised from seed, but care should be taken to remove the little silky hair with which (like many Compositae) it is protected. If this is buried too the seed will not germinate. Sow the seed in pots, not in the open; but plant out early. It likes plenty of air and manure and not too much water. It needs greenhouse protection during the winter with us, but is hardy on the Riviera.

The hybrid forms were first produced by Mr. Irwin Lynch at Cambridge as a cross between *G. Jamesonii* and *G. viridifolia*; M. Adnet has now obtained over 150 different colours. The six best are *Mademoiselle Raux*, pure white; *Madame Ph. de Vilmorin*, clear pink; *Madame Booch*, orange pink; *M. Irwin Lynch*, purple; *Président* [illegible], sulphur yellow; *M. S. Mottet*, orange yellow. The shape of the flowers also varies, some being helicoid, others tubular, &c. A striking feature of these hybrids is the fact that they travel well as cut flowers, and last ten to fifteen days in water.—*F. A. W.*

Germination, Abnormal, in Peganum Harmala. By J. W. Bews (*Trans. Bot. Sci. Edin.*, 1908, part iv. pp. 342–3; 1 pl.).—A description of germination of these seeds under abnormal conditions—namely, in a germinator at 30° C.—*E. A. Bd.*

Gladiolus Gandavensis. By Joseph Jacob (*Garden*, March 20, 1909, p. 141).—The article contains a good account of the history and principal raisers of these bulbs.—*H. R. D.*

Gooseberry Disease (*Botrytis cinerea*). By F. W. Hammond (*Garden*, April 24, 1909, p. 197). This disease is causing considerable destruction in many gardens and plantations. It is first noticed in summer, when the edges of the leaves on affected plants look brown and scorched; in winter the young wood appears withered and dead. The mycelium first attacks the sappy shoots, and passing downwards kills the shoot. The disease is propagated by summer spores. For remedy, spray with Bordeaux Mixture as soon as the fruit is gathered; in winter prune back to sound wood, and burn all affected prunings; in spring syringe with sulphide of potash.

The writer suggests ½ oz. or 1 oz. sulphide to the gallon of water, but this seems strong for young growth.—*H. R. D.*

Gooseberry Pests. By C. Doublesel (*Le Jard.*, vol. xxiii. No. 533, p. 133; May 5, 1909; 2 figs.).—Some insects, such as the caterpillar of *Abraxas grossulariae* (white with pronounced spots), are common to many kinds of fruit-trees and only appear three or four on a bush, doing comparatively little damage. Others, however, like the larvae of *Nematus grossularia* (the so-called "false caterpillars" of four-winged flies), are less conspicuous, and far more abundant and destructive. Many larvae may be found on a single leaf, and they entirely strip the tree in their ravages. They are greyish-green in colour, with twenty legs ("real" caterpillars having only sixteen legs), and roll up the end of their body when touched. These must be picked off by hand in April and in August, as they have two generations, otherwise they drop to the ground when fully developed and spin cocoons.

Sesia tipuliformis is more partial to red and white currants. It produces a whitish caterpillar, hatched in July, which buries itself in the young wood till the spring, when it resumes its work of eating and burrowing till the branches are killed, when the moth emerges from the cocoon in April or later; it perforates the bark at the end of the tunnel in which the chrysalis was concealed, and flies off, leaving the empty chrysalis case in the tunnel.—*F. A. W.*

Grape, The Control of Black Rot of the. By C. L. Shear, G. F. Miles and L. A. Hawkins (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 155;

plates).—Black rot of Grapes due to the attack of the fungus *Guignardia Bidwellii* causes great loss to grape-growers in the States. Leaves, young shoots, and fruits are all attacked. If the fruit is attacked when very young it turns black and soon drops off, if later, the disease appears as a whitish spot on the fruit, which increases in size till the berry shrivels and becomes covered with the minute black fruits of the fungus. In some cases the berries rot rapidly and become soft. On the young shoots numerous small, reddish brown spots appear as the result of the attack of the fungus.

Infection comes in the spring, probably from the winter spores on the old black-rot mummies, and it is desirable that all the infected wood and decayed berries should be pruned away and destroyed by fire as early as possible. Spraying with Bordeaux mixture will then very greatly reduce the amount of disease. Several formulæ for the making of Bordeaux mixture were tried and the most effective was found to be

4 lb. copper sulphate
3 lb. quick (unslaked) lime
50 gallons water.

when spraying was commenced at the time the young branches were eight inches to twelve inches long (no benefit followed earlier spraying) and repeated at intervals five or six times. A good non-staining spray was made by dissolving 1 lb. neutral copper acetate in 50 gallons water, and this was excellent for a final application. Lime-sulphur preparations have not been sufficiently tested to determine their value. Thorough application, at the proper time, with correctly compounded sprays made with pure materials only, gave the best results and sometimes reduced the amount of rot to 1 per cent.—*F. J. C.*

Grape-growing. By O. B. Whipple (*U.S.A. Exp. Stn., Colorado, Bull.* 141; April 1909).—This deals fully with the cultivation of grapes in the peculiar climatic conditions of Colorado, from the preparation of the soil for planting to the packing of the fruit for market. One observation of possibly general interest is the superiority in flavour, sugar content, and travelling qualities, of the fruit from vines which are allowed to become dry at the roots during the ripening process.—*A. P.*

Grape-growing in New York. By M. J. Dorsey (*U.S.A. Exp. Stn., New York, Bull.* 315; March 1909).—The author discusses the natural factors influencing grape culture, such as location, soil, climate, &c., and the position of the principal grape districts in this respect. A brief description of the most important species of *Vitis* is given, together with a table of 161 varieties, showing their size, colour, flavour, season, use, fertility or sterility of blossom, &c., with short notes on their commercial value.—*A. P.*

Grape Rot, due to Pestalozzia uvicola Speg. By F. A. Wolf (*U.S.A. Exp. Stn., Nebraska*, 1908; with fig.).—This disease was first discovered in Italy in 1877, and has now appeared in Nebraska on ripe grapes. The first time it has been recorded out of Europe.—*M. C. C.*

Grape Root-worm Investigations in 1907. By F. Johnson (*U.S.A. Dept. Agr., Bur. Entom., Bull.* No. 68, pt. vi.; figs.).—The grape root-worm (*Fidia viticida* Walsh) has done great harm in the vineyards about Lake Erie. It has been found that thorough spraying with lead arsenate, when the beetles emerge about the middle of July (the date varies with weather conditions), reduces the deposition of eggs by a large percentage. The spray formula recommended is—

5 lb. copper sulphate,
5 lb. fresh stone lime,
3 lb. arsenate of lead,
50 gallons of water.

F. J. C.

Grapes nourished with Sugar Candy. By C. Arranger (*Le Jard.*, vol. xxiii. No. 536, p. 189; June 20, 1909).—The authors announce that it is possible by feeding grapes on sugar candy to get them to ripen two to three weeks earlier than would naturally be the case, sugar candy supplying the necessary carbohydrate. The method is very simple and seems to deserve a trial. M. Pauchet, the inventor, merely pruned his shoots as usual, leaving, however, 4 or 5 nodes above the last bunch and then bent them obliquely down, so that they dipped into flasks containing 150 to 200 c.c. of solution of sugar candy of 12·5–14·5 per cent., *i.e.* 124–145 grammes per litre. The solution should not be more concentrated than this. It is well to choose thick shoots since they absorb better than very small ones; they should be stripped of secondary growths, and lightly scored longitudinally, to let in the fluid. They are then rubbed with sterilized cotton-wool and introduced into the flasks. The proper time is after the vine has flowered and the young grapes are set. The absorption of sugar should not be allowed more than three weeks. When the shoot ceases to absorb more than 1–2 c.c. a day it is removed from the flask, washed in boiling water, and the end cut back halfway. The flasks should be boiled for two hours, and the solution prepared twice over by boiling. The flasks are filled with a pipette passed through the flame and boiling water, and covered with sterilized cotton-wool, to avoid all risk of mould, &c. They should be closely watched for several days, and removed at once if the solution looks at all muddy, in which case the entire process must be repeated.

M. Pauchet has further tried to obtain artificial flavours by impregnating the grapes with raspberry syrup, &c.—*F. A. W.*

Growth, Measurements of, in Grafted Trees. By M. Nomblot-Bruneau (*Jour. Soc. Nat. Hort. Fr.*, June 1909, p. 350).—A tabulated account of some curious and precise investigations that were carried on during the whole of one season into the exact amount of growth made by first-year grafts of pears during each consecutive period of twelve hours.

M. L. H.

Guelder Roses, To Force. By E. Galois (*Le Jard.*, vol. xxiii. No. 532, p. 12; April 20, 1909; 1 fig.).—*Viburnum Opulus* can be trained into a pretty pot-plant by pruning it into the required shape, plucking off half the leaves from the branches, taking it up from the open ground in December, and potting in loose mould. It must be kept cool till the middle of January, then forced on, and moderately watered. It should be a mass of bloom by March 15, the boughs having been trained in the form of a pyramid.—*F. A. W.*

Gymnosperms, Evolutionary Tendencies (*Bot. Gaz.* vol. xlviii., No. 2, pp. 81–97, August 1909).—In this paper, Professor John M. Coulter traces the general history of the Gymnosperms. In the Palaeozic period the two groups Cordaitales and Cycadofilicales (*sic*) were already separated. From the latter sprang the Bennettitales and Cycadales of the Mesozoic. The Ginkgoales and Coniferales are supposed to have originated in the Cordaitales. Of Coniferales, Abietineae and Araucarineae were the first to appear. Taxodineae, Cupressineae and perhaps Taxineae are traced to the primitive Abietineae, and Podocarpineae are derived from Araucarineae. Gnetales may possibly have sprung from the primitive Cupressineae.

The author then discusses the phytogenetic changes in vascular anatomy, leaf, strobilus, stamen, ovule, embryo, and female and male gametophyte.—*G. F. S.-E.*

Helianthus sparsifolius. By S. Mottet (*Le Jard.*, vol. xxiii. No. 538, p. 217; July 20, 1909; 2 figs.).—This Helianthus was introduced to the Natl. Hort. Soc. of France in 1906. It is an American hybrid, obtained from *Helianthus rigidus* × *H. annuus* var. *californicus*. It is a valuable border plant, but is unfortunately sterile and needs protection in winter. It resembles *H. laetiflorus* rather than *H. rigidus*, but is infinitely superior to the well-known variety of the former, 'Miss Mellish.' The plant attains a height of 3–4 m., the flowers being extremely abundant and lasting till the end of September. The capitula are 15–18 cm. in diameter, with a good disc, and four rows of ray florets, which roll slightly inwards.—*F. A. W.*

Hollyhocks.—By M. Alin (*Le Jard.*, vol. xxiii. No. 537, p. 200; July 5, 1909; coloured plate).—In the general observations in this article the author comments on the curious fact that double Hollyhocks are fertile, since only the filaments of their stamens are transformed into petals. The anthers persist and are very productive. Accordingly the plant is almost always raised from seed. Some growers, however, prefer to divide the clump, or to graft, or take cuttings, to ensure the purity of any special strain. Directions for all these methods are given in the article, and are familiar to English gardeners. Hollyhock disease (due to *Puccinia malvacearum*) may be checked by setting the plants sufficiently far apart and not growing them too long in the same spot. It is also advisable to sponge the leaves on both surfaces, with a $\frac{1}{1000}$ solution of copper sulphate.—*F. A. W.*

Hybridization of Peas. By F. Wakerley, M.Sc. (*Gard. Mag.* No. 2891, March 27, 1909, pp. 244; figs.).—Results of hybridization of edible peas compiled from experiments conducted at the Midland Agricultural and Dairy College. The effects of a large number of crosses are recorded and well illustrated by a series of figures.—*E. B.*

Hybrids, Triple (*Bot. Gaz.* vol. xlvii., No. 1, pp. 1–8, January, 1909).—Professor Hugo de Vries has a further paper on hybrids of *Oenothera Lamarckiana.* It is perhaps best to give the author's own summary.

1. "Triple hybrids are produced in crosses of *Oenothera scintillans* and *O. lata* by such species as produce twins from *O. Lamarckiana.*

2. "The species investigated are *O. strigosa* Rydb., *O. Hookeri* F. and G. and one of the American subspecies of *O. biennis.*

3. "Of the triple hybrids, two are the same as the twins from the corresponding *Lamarckiana* crosses and bear the characters of *O. laeta* and *O. velutina* combined with those of the other parent.

4. "The third type resembles the mother (*O. lata* or *O. scintillans*) but in its special marks is also intermediate between its parents.

5. "The *laeta* and *velutina* are constant and uniform in the succeeding generations so far as experience goes. In this respect they follow the rule for the twin hybrids of *O. Lamarckiana.*

6. "The *laeta,* however, in the only case tried, repeated the splitting after self-fertilization, producing, however, only *lata* and *velutina.*

7. "It seems probable that the whole progeny of the crosses named should split up into two equal parts *laeta* and *velutina,* and that each of them should produce a certain percentage of *lata.* In this way quadruple hybrids would arise."—*G. F. S.-E.*

Impatiens Hawkeri. By J. D. Hooker (*Bot. Mag.* tab. 8247).—Nat. ord. *Balsamineae.* Eastern New Guinea. Herb, 1½–2 feet high; leaves 4–6 inches long; flowers solitary, 2¼–3 inches across, bright red.—*G. H.*

Inheritance of Strength in Wheats. By Professor R. H. Biffen, M.A. (*Journ. Agr. Sci.*, vol. ii. (1908), p. 86).—The author shows that, though certain complications occur, the character of "strength," in wheats (the property of wheats in virtue of which a large loaf is produced) is hereditable and in Mendelian parlance "dominant." He considers that there is every hope of producing strong wheats giving yields as high as those of the best known "weak" English wheats.—*F. J. C.*

Insect Parasitism. Its Value to the Farmer. By F. M. Webster (*U.S.A. Dep. Agr. Year Book*, 1907, pp. 237–256; 24 pl.).—A remarkable account of the economic application of insect parasitism, which, owing to the detail with which the subject is presented, is impossible to summarize.—*E. A. Bd.*

Insecticide, Improved (*Jour. Soc. Nat. Hort. Fr.*, March 1909, p. 192).—Certain insects seem impervious to tobacco washes, by reason probably of a coating of some greasy matter over their bodies, and it is suggested that the addition of a certain quantity of methylated spirit to the tobacco liquor would probably make it more effective in these cases.

M. L. H.

Iris, Dutch. A new early race. By Joseph Jacob (*Garden*, July 17, 1909, p. 349). These are bulbous Irises, 10 days to a fortnight earlier than the Spanish Iris, which they resemble in appearance, though the foliage is more like the English variety; thus they succeed the Tulip in time of flowering. They were obtained by crossing, *filifolia*, *Boisseri*, *tingitana* and others. Nine varieties named after Dutch painters, are mentioned.—*H. R. D.*

"Jardins Ouvriers." By M. J. Curé and by M. R. Delille (*Jour. Soc. Nat. Hort. Fr.*, April 1909, p. 294, and June 1909, p. 378).—Both these articles deal with attempts which have been made in various industrial centres in France to provide the artisan population with bits of garden ground where they may grow vegetables and flowers for themselves and their families, and may incidentally find a counter-attraction to the public-house and cultivate the domestic virtues.

So far the movement has resulted chiefly from the efforts of certain philanthropists and social reformers, but attempts are being made to enlist the help of practical horticulturists.

Where such help has been forthcoming the success of these colonies of gardens has invariably been assured, and it has been found that the evening classes and demonstrations in garden work which are started for the benefit of the mechanic are also much appreciated by the peasantry in the various neighbourhoods. The ideal of all concerned is that each individual tenant should eventually become the owner of his holding, and from experience gained at the most successful groups "Jardins Ouvriers" the following principles are established:—

1. The gardens must be enclosed, to give a home-like feeling to each tenant. This has been proved to be very important.
2. Each garden must not be larger than a man quite unused to the work may cultivate with ease during his leisure time, that the spot may be a source of pleasure and not a burden to him.
3. Some form of summer-house should be constructed in each garden, as a pleasant assembling place for the family.
4. Part of each garden should be devoted to fruit, part to flowers, part to the more delicate vegetables and fruits, such as tomatos, strawberries, and even melons, besides the commoner green crops, as the raising of those garden luxuries proves a great source of pride and pleasure to the fortunate grower, and it is even useful to devote some space to the simpler medicinal plants as a means of teaching botany to the younger generation.

Apropos to this question a recent French law is mentioned which authorizes the State to lend money for the purchase of small holdings, not direct to the individual, but to properly constituted local societies who advance the price of one hectare to applicants and are repaid in yearly instalments, the borrowers being bound to cultivate the land themselves and to insure their lives in a National Insurance Society as security for the loan.—*M. L. H.*

Julianiaceae, The Anatomy of the, Considered from the Systematic Point of View. By F. E. Fritsch, D.Sc., Ph.D., F.L.S. (*Trans. Linn. Soc. Botany* Vol. vii. Part 8, pp. 129-151; 1908. Plates 20 and 21, and two text figures).—The new Natural Order of the Julianiaceae was founded by Mr. W. Botting Hemsley to contain the two genera of *Juliania* and *Orthopterygium*. In discussing the affinities of the new Order Mr. Hemsley concluded that these lay with the Cupuliferae, the Anacardiaceae and the Juglandaceae. In the present contribution Dr. Fritsch has made a detailed anatomical investigation of the members of the new Order. He finds that the Julianiaceae show in their anatomical structure marked affinity to the Anacardiaceae—so marked indeed that it is difficult to hold the two Orders distinct from this point of view alone. This need not of course lead to the rejection of the Cupuliferous affinities maintained by Mr. Hemsley on the basis of external morphology. Mr. Hemsley did not consider that the relationship of the Julianiaceae with the Juglandaceae was a close one and Dr. Fritsch points out that anatomy gives no support at all to the existence of such an affinity. A very detailed account of the anatomical features of the Julianiaceae follows, for which the original must be consulted.—*R. B.*

Junipers, Fertilization of (*Bot. Gaz.* vol. xlviii., No. 1, pp. 31-46, July 1909; with 4 plates).—Miss Alice M. Ottley describes the fertilization and gametophytes of *J. communis* and *J. virginiana*. The paper is an important contribution to the cytology and phenomena of fertilization in the Gymnosperms.—*G. F. S.-E.*

Kitchingia uniflora. By O. Stapf (*Bot. Mag.* tab. 8286).—Nat. ord. *Crassulaceae*; Madagascar. Herb, prostrate and rooting at nodes; leaves opposite, obovate, crenate, 4–8 lines long; flowers terminal, urceolate, $\frac{3}{4}$ inch long, rose.—*G. H.*

Laburnums. By W. D. (*Garden*, March 29, 1909, p. 261).—The writer, in an interesting account of these trees, rightly lays stress on the value of the Scotch Laburnum (*L. alpinum*). He gives the usually accepted account of the origin of that puzzle of the botanist *L. Adami*, the purple Laburnum, which is that it was produced as a graft hybrid by grafting *Cytisus purpureus* on *Laburnum vulgare.* A good tree in blossom has a very peculiar appearance, having racemes of yellow flowers, racemes of purple flowers, and patches like miniature witches broom of *Cytisus purpureus*, with ordinary *Cytisus* flowers, the peculiarity of the plant being that although the three kinds of bloom may not be found on young plants they eventually appear.* —*H. R. D.*

Lakes, Filling up of (*Bot. Gaz.* vol. xlvii., No. 6, June 1909, pp. 445–453; with 5 figs.).—Mr. George Plumer Burns describes the manner in which certain post-glacial lakes near Ann Arbor, U.S., have been occupied by vegetation. There is a water-lily zone followed in succession by bog sedge, bog shrub, tamarack (*Larix americana*) and maple-poplar. The depths in the original post-glacial lake determined the position of open water, width of the various zones and amount of peat deposit. Wave action caused by the wind and the shoreward push of the ice prevents the bog flora from establishing itself in certain places where the water is shallow.—*G. F. S.-E.*

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* Whether a true graft hybrid really exists has long been a matter of difference between gardeners and botanists, but if there be such a thing possible, this is probably the best authenticated instance. For a further discussion of this case, those interested are referred to Kerner and Oliver's "Natural History of Plants," vol. 2, pp. 570–575. This curious plant was obtained at Vitry, near Paris, in the year 1825.—*H.R.D.*

Larix occidentalis. By W. B. Hemsley (*Bot. Mag.* tab. 8253).—Nat. ord. *Coniferae*; tribe, *Abietineae*. Western N. America. A tree, 250 feet in height, 6–8 feet thick; leaves 2–2½ inches long; male flowers in subsessile, subglobose clusters; ripe cones oblong, up to 1½ inch long, brown, bracts (carpels?) tailed.—*G. H.*

Laurelia serrata. By O. Stapf (*Bot. Mag.* tab. 8279).—Nat. ord. *Monimiaceae*; tribe *Laurelieae*. Chile. Tree, polygamo-monoecious, 70 feet high; leaves opposite, oblong-lanceolate, serrate, 2–5 inches long; inflorescence, axillary; flower, perianth segments 8, 1½ line long, ⅜ inch across, greenish-yellow.—*G. H.*

Lavender Culture in France. By M. D. Bois (*Jour. Soc. Nat. Hort. Fr.*, March 1909, p. 196).—A review of a pamphlet on lavender growing and distilling, carefully compiled by Mr. Lamothe in order to encourage the plantation of lavender in certain parts of Southern France which seem particularly adapted to its culture.—*M. L. H.*

Legislation and Insect Pests. By C. W. Woodworth (*Jour. Econ. Entom.* ii. (1909), 5, p. 359).—Many species of scale insects have established themselves in California in spite of a stringent horticultural quarantine and the exercise of great vigilance on the part of the officers. The author suggests that such laws are probably of little use.—*F. J. C.*

Lettuce. Development of New Varieties for Culture under Glass. By B. T. Galloway (*U.S.A. Dept. Agr. Year Book*, 1907, pp. 139–142; 1 plate).—An account of crossing at the Bureau of Plant Industry of different types with a view to supplying the demands for a variety which is resistant to sun burn and fungoid diseases, and which also meets with approval in the market.—*E. A. Bd.*

Leucojum vernum Vagneri. By S. Arnott (*Garden*, March 13, 1909, p. 125).—This snowflake, sometimes found under the name of *L. vernum carpaticum*, is distinguished from the other spring snowflakes by its small stature, earliness, and the frequency with which it has two flowers on a stem. The writer considers it one of the finest of all the snowflakes.
H. R. D.

Lilacs for Succession of Bloom (*Jour. Soc. Nat. Hort. Fr.*, May 1909, p. 330).—In the "Vie à la Campagne," No. 60, March 15, 1909, M. Abel Chatenay gives a list of fourteen fine lilacs the possession of which will insure a continuous succession of bloom during the longest possible period. These are 'De Marly,' *Alba grandiflora*, 'Virginal,' 'Marie Legraye,' *Macrostachya*, 'Lucie Baltet,' 'L. de Trianon,' 'Souvenir de L. Spath,' 'Madame Lemoine,' 'Madame Casimir Perier,' 'Comtesse H. de Choiseul,' 'Michel Buchner,' 'Charles Joly,' *Syringa pubescens*, 'De Breitschneider,' or *Syringa Emodi rosea*, and *Syringa Josikaea*.—*M. L. H.*

Lilium testaceum. By H. P. (*Garden*, July 3, 1909, p. 326.) The writer tries to trace the origin of this beautiful Lily; he quotes from a monograph by F. de Cannart d'Hamale, printed at Malines in 1870, from which it appears that it was first discovered by Monsieur Fr. Ad. Haage, junior, of Erfurt, in 1836, among a consignment of Martagons, and introduced into Belgium by L. van Houtte, of Ghent, who had received a case full of it from Van Weissenborn, of Erfurt, in 1840.—*H. R. D.*

Lime Washes, Adhesive Power of. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Eighth Report*, 1908, pp. 73–82).—Various experiments have been made to see how the adhesive powers of lime washes could be improved. None of the substances added to the lime wash satisfactorily prevented the flaking of the lime off the trees, but good results were obtained by the addition of 5 per cent. of flowers of sulphur, and also by the addition 6 to 12 per cent. of solar distillate. The adhesiveness of whiting was found to be less than that of lime, while bad results attended the addition of the basic sulphates of iron and copper, resin, paper pulp, salt, treacle, and soap.—*A. P.*

Linaria, Pollination in (*Bot. Gaz.* vol. xlvii., No. 6, June 1909, pp. 454–466; with 4 figs.).—Mr. E. T. Hill finds that as the heat (and perhaps light) increases in summer, the flowers of *Linaria canadensis* become gradually smaller and tend towards cleistogamy. (The smaller flowers require less food and permit a husbanding of resources for the production of seed.) The first flowers may be 6–8 mm. long while the later may be only 3–4 mm. Cleistogamy occurs on stems not more than 2 cm. high. A similar reduction in size may be observed in *Pavonia* spp., which begin to bloom in May and to diminish in size or become cleistogamous until the autumnal equinox, after which they again become larger until the beginning of winter and the close of their floral season.

G. F. S.-E.

Luminosity in Plants. By Bertha Chandler (*Trans. Bot. Sci. Edin.*, 1908, part iv. pp. 333–337).—A review of recorded cases of luminosity in plants from Linnæus onwards. A case is mentioned of decaying potatos becoming so luminous that at night the room in which they were stored appeared from outside to be on fire!

The author mentions the work of Mornay and **Martius**, and that of Molisch, but makes no contributions to existing knowledge.—*E. A. Bd.*

Magnesia, its Alimentary Importance in the Life of Plants. By Georges Truffaut (*Gard. Mag.* No. 2910, Aug. 7, 1909, pp. 614; fig.).—The author gives the results of analyses of the ashes of a large number of plants, and concludes from the large percentage of magnesia found in them that it plays a more important *rôle* in plant life than is usually supposed. Analysis proved its absence in measurable quantity from a number of soils. The high percentage of magnesia in the ashes of roses being noted, and certain soils in which it was deficient producing weak growth of roses, it was found that magnesia salts added as a manure produced marked results of increased vigour and growth.—*E. B.*

Magnolia Delavayi. By T. A. Sprague (Bot. Mag. tab. 8252).—Nat. ord. *Magnoliaceae*; tribe *Magnoliae*. China. Shrub, 8 feet, or tree, 15–30 feet; leaves ovate, 7–13 inches long, 4–7 inches broad; flowers, expanded, 8 inches broad, creamy-white.—*G. H.*

Mahonia arguta. By J. Hutchinson (*Bot. Mag.* tab. 8266).—Nat. ord. *Berberideae*; tribe *Berbereae*. Central America? Shrub; leaves 4–6-jugate; panicles clustered, 12–16 inches long; flowers yellow; berry globose, $\frac{1}{3}$ inch across, dark blue.—*G. H.*

Maize. Ear Rots of Corn. By Thomas J. Burrill and James T. Barrett (*U.S.A. Agr. Exp. Stn., Illinois, Bull.* 133, 1909: with 11 plates).—The diseases here reported are *Diplodia zeae* (Schw.), Lev., on the ears and stalks, and three different species of *Fusarium*, none of which appear to have been specifically described, but are referred to as *Fusarium* I., *Fusarium* II., and *Fusarium* III. The "Bulletin" is chiefly occupied with the life history of *Diplodia zeae* and the synonymy of the several species described at different times, and under various names, which are referable to the same species.—*M. C. C.*

Maize, Effect of Selection on (*U.S.A. Agr. Exp. St., Illinois, Bull.* No. 132; Feb. 1909).—In a field of Indian Corn it will be noticed that there is a great divergence in the exact angle at which the ears are carried on individual plants, and it is now proved that it is possible by careful selection materially to reduce this divergence in certain strains. Many growers are of the opinion that in some ways declining ears are less susceptible to injury than erect ones, so if it is ever considered desirable to produce a strain with this or the reverse characteristic it is evidently only a matter for the breeder. It was also found possible in five years to raise strains varying largely in the height from the ground at which they carried their ears.—*M. L. H.*

Maize, The Importance of Broad Breeding in. By G. N. Collins (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 141, part iv. 1909).—A warning against the dangers of the persistent in-breeding to which scientific American growers are inclined to subject their seed Indian corn in their efforts to produce an improved or unknown strain.

In-breeding tends naturally to diminish the vigour of the progeny, so that, though selection is of course always directed towards an increase of size, the two processes do but neutralize each other at best. By judicious selection combined with cross-breeding the real improvement is to be looked for.—*M. L. H.*

Manures, Effects of Different. By M. L. Condry (*Jour. Soc. Nat. Hort. Fr.*, April 1909, p. 247).—An account of some experiments carried on on a portion of the ground of the School of Horticulture at Plessis-Pignet. The objects aimed at were to arrive at what was actually the best manure for certain vegetable crops, and which were the most economical to use having regard to the price of the manure and the value of the extra crop due to its action. A chemical analysis of the soil of the trial ground is given, and tables showing the chemical composition and the market price of the various manures, organic and chemical, which were tried. Other tables show the approximate profit from an acre which resulted from the use of each fertilizer in the case of each vegetable under observation, including cabbages, leeks, lettuces, cabbage and cos, chicory, onions, shallots, garlic, radishes, beetroot, beans, and celeriac.

M. L. H.

Maple Syrup, Mould. *Torula saccharina.* By F. D. Heald and Venus W. Tool (*U.S.A. Exp. Stn., Nebraska*, 1908; with 7 figs.).—This syrup mould produces a thin, slightly powdery growth, when young of a pale brown colour, becoming a little darker with age. The spores are spherical or slightly elongated, 2·8μ or 2·8μ × 4μ, produced on club-shaped conidiophores in chains, and constituting dense tufts.—*M. C. C.*

Mealy Bug on Vines. By W. Strugnell (*Garden*, March 13, 1909, p. 123).—The writer claims to have got rid of this pest as follows:—He winter-dresses the vines with a paint made of clay, water, and just enough gas tar to colour it, painting the wires, eyelets, and ironwork with pure petroleum, or more safely with methylated spirit. He follows this up with a weekly service of methylated spirit applied with a camel's hair brush or feather, the brush or feather charged with spirit instantly "melting" the mealy bug. Winter-dressing alone was found useless.

H. R. D.

Meconopsis. By J. Smith (*Gard. Mag.* No. 2907, July 17, 1909, pp. 556).—A brief history of the introduction of *M. integrifolia* and its successful cultivation, with notes on some of the other species.—*E. B.*

Megaclinium purpureorachis. By R. A. Rolfe (*Bot. Mag.* tab. 8273).—Nat. ord. *Orchidaceae*; tribe *Epidendreae.* Congo. Epiphytic herb; leaves 8–12 inches long; scapes stout, suberect, 12–14 inches long; rachis broad, flat, slightly twisted, covered with purple spots, 6–8 inches long; flowers brown, velvety outside, ½ inch long.—*G. H.*

Melons, a Mycosphoerella Wilt. By J. G. Grossenbacher (*U.S.A. Agr. Exp. Stn., Geneva, N.Y.*, No. 9, 1909; with 6 plates).—This disease occurred on the vines of *Cucumis Melo* and probably *Citrullus vulgaris.* In its mature condition it is named *Mycosphaerella citrullina* (C.O.Sm.), and has as pycnidia *Diplodia citrullina* (C.O.Sm.), which also is *Ascochyta citrullina* (C.O.Sm.). The vines were parasitized by the *Mycosphaerella* shortly before the earliest melons were ripe. The disease was preceded by the attacks of a red spider, although in 1908 the damage by spider was but slight.—*M. C. C.*

Microcachrys, Pollen of (*Bot. Gaz.* vol. xlvii., No. 1, pp. 26–29, January 1909; with 2 plates).—Mr. Robert Boyd Thompson describes and figures the pollen of *M. tetragona*, a rare Tasmanian conifer. It is usually three-winged but is variable in this respect, for as many as six wings have been discovered. There are three or four prothallial cells in the mature pollen.—*G. F. S.-E.*

Microcycas, Anatomy of Seedling of (*Bot. Gaz.* vol. xlvii., No. 2, pp. 139–147, February 1909; with 2 plates).—Miss Helen Angela

Dorety finds that in *M. caleoma* there is no resting stage in the develop- of the embryo, and that there are two cotyledons with hypogeal germination. Mucilage ducts alternate with eight to ten cotyledonary strands (endarch at base and exarch in the upper portions). The root is usually tetrarch.—*G. F. S.-E.*

Microloma tenuifolium. By N. E. Brown (*Bot. Mag.* tab. 8248).—Nat. ord. *Asclepiadaceae*; South Africa. Herb with twining stems; leaves opposite, 1-$2\frac{3}{4}$ inches long, 1-$1\frac{1}{2}$ wide; cymes 3–7-flowered; corolla, urceolate, crimson, tube $\frac{1}{5}$ inch long.—*G. H.*

Mulberry Scale (Diaspis pentagona). (*Le Jard*, vol. xxiii. No. 539, p. 232; August 5, 1909.)—This formidable parasite which was introduced at Kew some years ago on a consignment of *Prunus Pseudo-cerasus* from Japan, and stamped out with difficulty, is now attacking the Mulberries in Italy. Since it is a deadly foe to plums, almonds, peaches, and cherries, M. Bouvier has addressed a report to the French Soc. Nat. et Agr. urging them to keep a sharp look-out on all imported plants. No measures can be too drastic to avert this pest, and the infected trees at Kew were all burned when it was discovered.

F. A. W.

Mussaenda Treullere. By O. Stapf (*Bot. Mag.* tab. 8254).—Nat. ord. *Rubiaceae*; tribe *Mussaendeae.* Tropical Himalaya and Khasia. A shrub; leaves ovate, acuminate, 6-12 inches long, 3–6 inches wide. Corymbs, many-flowered; lobes of corolla $\frac{3}{4}$ inch across, red orange.

G. H.

Mussel Scale. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Eighth Report*, 1908, pp. 33–55).—This is a continuation of the investigations described in the "Sixth Report," where an emulsion-soda wash containing 2 per cent. of caustic soda, 6 per cent. of paraffin, and $\frac{1}{2}$ per cent. of soft soap (for which latter is now substituted copper or iron sulphate with lime; see abstract "Emulsions") removed all moss and lichen and destroyed nearly all the eggs of the mussel scale. These results have now been confirmed, especially where the application—which should not be too early in the dormant season—has been followed by that of a weak emulsion at hatching time (June). The use of a 2 per cent. solution of caustic soda resulted in the destruction of the eggs under favourable conditions only, but this was assured when a stronger solution—$2\frac{1}{2}$ to 3 per cent.—was used, though this is dangerous to the workmen. A 10 per cent. brine caused considerable destruction of eggs, and this was increased by the addition of 2 per cent. of caustic soda.—*A. P.*

Narcissus. By Joseph Jacob (*Garden*, August 14 and 28, 1909, pp. 399 and 423, and coloured plates).—Some of the newer Narcissi are depicted and described, viz. 'Prospero,' 'Challenger,' 'Masterpiece,' 'Peter Barr,' 'Snow King,' 'Rev. D. R. Williamson,' 'Warley Scarlet,' 'Lord Roberts,' 'Czarina,' 'Lady of Shallot,' 'Triandrus hybrid seedling,' 'Fire Queen,' in the first reference and 'Childe Harold,' 'Oliver Goldsmith,' 'Mariette,' 'Coreen,' and 'Evangeline,' in the second. On August 21 p. 409, the same writer describes 'Elfrida Pearson' (fig. p. 408).—*H. R. D.*

Narcissus Poetaz. By Joseph Jacob (*Garden*, May 29, 1909, p. 267).—A good description of this new section of Daffodils, with an account of their origin and principal varieties.—*H. R. D.*

New Plants from Guatemala. (*Bot. Gaz.* vol. xvlii, No. 4, pp. 253– April 1909).—New species of the following genera are described by Mr. John Donnell Smith, viz.:

Magnolia, *Marila*, *Leandra*, *Hoffmannia*, *Guettarda*, *Chomelia*, *Satria*, *Gonolobus* (2), *Merinthopodium*, *Neotuerckheimia* (new genus of Bignoniaceae) (2), *Justicia*, *Buprechtion* (2), *Duphnopsis* (*Nordmannia*), *Euphorbia* (*Alectoroctonum*). The specimens were collected by H. von Tuerckheim in 1907–1908.—*G. F. S.-E.*

New Plants of Nevada and Arizona. (*Bot. Gaz.* vol. xlvii., No. 6, June 1909, pp. 425–437).—Mr. Aven Nelson describes a number of new species and varieties collected by Mr. Leslie N. Goodding in the deserts of southern Nevada and Arizona.

They include new species of *Calochortus*, *Lesquerella*, *Linum*, *Condalia*, *Mentzelia* (2), *Chylisma*, *Lavauxia*, *Pachylophus*, *Quincula*, *Physalis*, *Gaillardia*, *Enceliopsis* new genus (Helianthella), including various *Encelias* and a new species, *Chaenactis*, *Dysodia* (2), and various new names of *Dysodia* spp. put under *Hebetina*.

A new species of *Euphorbia* from Colorado (Baker, Earle, and Tracy, n. 23) is also described.—*G. F. S.-E.*

Nicotiana, Parthenogenesis in. By Mrs. R. Haig Thomas (*Mendel Jour.* pp. 5–10; Oct. 1909).—The authoress shows that certain species of *Nicotiana* are capable of producing seed without fertilization. *N. suaveolens* from Australia, *N. sylvestris*, *N. Tabaccum* vars. as well as several allied hybrids, behave in this way. It is suggested that since *N. Sanderae* breeds true from seed it was produced by selection from parthenogenetic seedlings of the alleged seed parent, *N. Forgetiana*. If it had been the result of a cross between *N. Forgetiana* and *N. affinis* the authoress suggests that it ought to segregate and throw seedlings of various kinds, but it is also possible that it is because seed is produced parthenogenetically that the plant breeds true (and it is shown that it does produce seed without fertilization).—*F. J. C.*

Nototriche. A Revision of the Genus. By A. W. Hill, M.A. (*Trans. Linn. Soc. Bot.* Vol. vii. Part 12, pp. 201–266; 1909. Plates 27–30 and text fig.).—It is impossible to mention here the wealth of interesting details contained in the paper, but reference may be made to the light which Mr. Hill believes these plants throw on the origin of new species by mutation. The species of the genus *Nototriche* exhibit such a diversity in leaf-form, in distribution and character of tomentum, etc., that it is difficult to suppose that all these many variations in form have an adaptive significance. When we find several species exhibiting a number of distinct modifications in their form growing in close association on the same substratum the difficulty becomes even greater. Moreover, some species have an extraordinarily local distribution, since a single species may be confined to one particular and isolated area "where it exists as it were on an island cut off from its nearest allies."

Mr. Hill believes that the most satisfactory explanation of these facts is that the many specific forms have arisen as chance variations, sports, or mutations. Such mutations may either have remained where they arose or they may have gradually spread, and as they spread they may themelves have again varied and thus given rise to new and slightly different races, which produced in this manner a chain of allied forms distributed over a fairly extended area. Certain forms may perhaps have remained stable for long periods and by the intercalation of other unrelated species, and possibly by the dying out of those most nearly related to them, these forms may have come to occupy isolated positions.—*R. B.*

Oenothera Hybrids, Cytology of (*Bot. Gaz.* vol. xlviii., No. 3, pp. 179–199, September 1909; with 3 plates).—Mr. Reginald Ruggles Gates finds that the hybrids of *O. lata* and *O. gigas* have twenty-one chromosomes in the somatic cells of which fourteen are of paternal origin (*O. gigas*) and seven maternal (*O. lata*). (In one individual there were only twenty chromosomes). The number present in any individual is always the sum of the chromosomes in the germ cells from which that individual is formed. At the time of reduction, half the germ cells receive ten and half eleven chromosomes, but nine or twelve chromosomes are occasionally found.—*G. F. S.-E.*

Onion, The Wild (*U.S.A. Dep. Agr., Bur. Pl. Ind.*; Nov. 1908).—Hints on the best means of extirpating the Wild Onion (*Allium vineale*). Besides its wide-spread dissemination by means of aerial bulbils this weed possesses one peculiarity which makes it more than usually troublesome. Each bulb divides into a bunch of bulbs, one of which, covered by a soft skin, starts growing at once, while the other smaller ones, encased in a horny covering, remain in the ground some months before they sprout. It is therefore necessary to resort to two distinct operations in order to destroy the pest thoroughly.—*M. L. H.*

Opuntia rubricata. By N. E. Brown (*Bot. Mag.* tab. 8290).—Nat. ord. *Cactaceae*; tribe *Opuntieae.* Mexico and S.W. United States. Shrub, 3–7 feet high, or tree, 15 feet. Flowers 2–3 inches across, bright purple.—*G. H.*

Orchard Fertilization. By J. P. Stewart (*U.S.A. Exp. St., Pennsylvania, Bull.* 91; April 1909).—We have few accurate data upon which an exact system of orchard fertilization can be based, and this does not add much to our definite knowledge, for, after quoting the evidence afforded by three well known long-time experiments (among them Woburn), only one of which showed decided beneficial results from fertilizers of any kind, details are given of an elaborate system of experiments which have been in operation in this State since 1907, the results of which should be valuable in years to come. There is one outstanding feature: the results of the application of soluble nitrogen coincide with those of

Woburn in indicating the advisability of delaying such applications until the season's growth is well advanced but not completed, using it judiciously, on account of its effect on colour. The writer urges every fruit-grower to maintain some portion of his orchard for experimental work, that being the best place to determine its crop-limiters and to develop and maintain its balanced treatment.—*A. P.*

Orchards, Tillage, Fertilizers, and Shade Crops for. By Wendell Paddock (*U.S.A. Exp. Stn., Colorado, Bull.* 142; March 1909).—The author recommends the growth of cover crops in preference to clean cultivation in the orchards of the hot, dry districts of Colorado, and deals with the beneficial effects of the ploughing in of the crops and their subsequent decay.—*A. P.*

Osoberry (*Nuttallia cerasiformis*). By E. Beckett (*Garden*, April 10, 1909, p. 175).—This is described as an early-flowering shrub amenable to almost any soil and climate. During midwinter it begins to push forth pale green buds, and for some weeks has the appearance of just breaking into flower. When expanded, which generally occurs in March, it lasts for a considerable time. It resembles a small white *Ribes*, and produces a dark red fruit about the size of a cherry, but, as the plant is diœcious both sexes must be grown.—*H. R. D.*

Oyster Shell Scale. By F. Cranefield (*U.S. State Hort. Soc. Wisconsin, Bull.* 16; May 1909).—Treatment with lime-sulphur wash during dormant period, and kerosene emulsion during the two months during which the young lice are moving about, or with soap-suds made of $\frac{1}{2}$ lb. common soap and $\frac{1}{4}$ lb. washing soda dissolved in five gallons of boiling water; mix thoroughly and apply with spray pump.

Lime-sulphur wash is most readily prepared where there is access to a jet of steam, or where facilities are handy for boiling the material. Unless steam is available, it is preferable to use the kerosene emulsion rather than the home-made sulphur wash; but where steam is available the latter insecticide may be readily prepared. Steam also saves time in preparing kerosene emulsion.

Commercial insecticide firms are now preparing the lime-sulphur wash, and these mixtures are being tested by the Experiment Station. Judging from results thus far the commercial lime-sulphur wash will prove very effective, applied when the trees are dormant. Pumps are being sold with kerosene attachments which spray kerosene and water by forcing the kerosene and water in intimate mixture through the nozzle; this mixture should only be used for a winter spray. *C. H. H.*

Paeonies, Two New Herbaceous. By Ph. Rivoire (*Jour. Soc. Nat. Hort. Fr.*, July 1909, p. 434).—Two new herbaceous paeonies produced by B. Rivière, of Cuire-les-Lyon, are said to be of value.

'Poète Mistral' has outer petals of bright pink with full, fringed, salmon-coloured centre.

'Philippe Rivière,' semi-double, is dark purple amaranth in colour and has a strong tea-rose scent, not hitherto possessed by any paeony of this shade.—*M. L. H.*

Parasitic Diseases of Plants, A Method of Checking. By M. C. Potter (*Journ. Agr. Sci.*, vol. ii. (1908), p. 102.—The author found that, as with other bacteria, *Pseudomonas destructans*, the cause of "white rot" in turnips, produced during its growth a substance poisonous to itself. This toxic substance was not destroyed by heating to boiling point, but the enzyme, cytase, which produced the peculiar appearance following the attack of the bacillus upon the turnip, was destroyed. When the bacilli were brought into contact with the toxin their movements at once ceased and they were finally killed. Treatment of diseased patches upon the turnip prevented the further development of the disease. The substance was not toxic to *Penicillium* and certain bacilli, but remained unchanged after these organisms had been growing upon the turnip. The author has also found that *Penicillium italicum*, which causes rotting of oranges, also produced a substance which inhibited its further growth.

How far these discoveries may prove applicable in practical treatment of plant diseases remains to be discovered, but they open out a fascinating field for research.—*F. J. C.*

Parthenocissus tricuspidata. By T. A. Sprague (*Bot. Mag.* tab. 8287).—Nat. ord. *Ampelidaceae*; Japan and China. Shrub, climbing by viscous tips to tendrils; leaves polymorphic, simple to 3-foliate, toothed; cymes from short shoots; flowers densely clustered, ¼ inch across.—*G. H.*

Peach Curculio, Experiment in Control of. By E. P. Taylor (*Jour. Econ. Entom.*, ii. (1909), 2, p. 154).—This insect (*Conotrachelus nenuphar* Hbst.) is one of the worst pests of peach orchards in the Mississippi Valley. Spraying with Swift's arsenate of lead paste with a power outfit on a block of 1,195 six-year old trees was followed by a great reduction in the amount of damage done by the weevil. Far fewer peaches fell prematurely, and over and above this there was a great reduction in the amount of brown rot (due to *Monilia fructigena*) which often followed the puncture of this pest. The strength of the solution used was 2 lb. of the arsenate of lead paste and 4 lb. quicklime to 50 gallons of water. This solution sometimes caused injury to the foliage, but more often when the foliage was older than when the spraying was done early; the addition of lime reduces the danger of injury, but it is well to be very cautious in applying arsenate to peach trees, as the action varies under different conditions. The spraying was best done as soon as the petals had fallen.—*F. J. C.*

Pecans, Notes on Additional Insects on Cultivated. By G. W. Herrick and R. W. Harned (*Jour. Econ. Entom.*, ii. (1909), 4, p. 293).—A list of insects with notes on their habits, supplementing the list published in Bulletin 96 of the U.S.A. Exp. Stn., Mississippi.—*F. J. C.*

Peliosanthes violacea var. **Clarkii.** By C. H. Wright (*Bot. Mag.* tab. 8276). Nat. ord. *Haemodoraceae*: tribe *Ophiopogoneae*. S.E. Asia. Herb; leaves oblong-lanceolate, petiolate, 1 foot long; racemes 6 inches long; flowers solitary, dark purple, ¼ inch long, ⅜ inch broad.—*G. H.*

Picris formosa. By S. A. Skan (*Bot. Mag.* tab. 8283).—Nat. ord. *Ericaceae*; tribe *Andromedeae*. India and China. Shrub or small tree, 20 feet high; leaves clustered at the end of twigs, 2 5 inches long; flowers pendulous in drooping, many-flowered panicles; corolla urceolate, 3½–4 lines, long, white or tinged with rose.—*G. H.*

Pinus edulis (*Bot. Gaz.* vol. xlviii., No. 3, pp. 216 223, September 1909).—Mr. F. J. Phillips finds that this species, the Piñon, thrives on coarse gravel or sand slopes from about 5,400 to 7,700 feet. It is able to fix itself in rock crevices and is one of the first trees to establish itself on lava-flows. Its associates are usually *Pinus ponderosa*, *Juniperus monosperma*, *J. pachyphloea*, and scrub oaks. It grows well in a dry country with only 13 inches of rainfall. The best trees are 40 to 45 feet in height and 2 to 2·5 feet in diameter. It requires plenty of sunlight. The wood forms good fuel, but is not durable when used as poles or fencing. The seeds are sold as a delicacy throughout the U.S. at from 40 to 60 cents a pound; about 300 lb. have been obtained per acre. Seed years occur once in every five years. The seeds are often infertile.

Natural regeneration is exceedingly difficult.—*G. F. S.-E.*

Pinus Jeffreyi. By W. B. Hemsley (*Bot. Mag.* tab. 8257).—Nat. ord. *Coniferae*; tribe, *Abietineae*. Western N. America. Tree, 40 feet high; leaves 6–10 inches long. Male cones, many at the bases of young shoots, 1½ 2 inches long; female cones solitary, when ripe pendulous, oblong, 6–7 inches long, purplish-brown.—*G. H.*

Pinus, Parthenogenesis in (*Bot. Gaz.* vol. xlvii., No. 5, May 1909, pp. 406 409; with 1 fig.).—Mr. W. T. Saxton describes cases of parthenogenesis in *P. Pinaster* and figures the difference between these and normal development after fertilization.—*G. F. S.-E.*

Platanthera chlorantha with Three Spurs, Another specimen of. By W. Botting Hemsley, F.R.S. (*Jour. Linn. Soc.* vol. xxxviii. No. 267, pp. 391-394; 1908, with 2 text figures).–In a previous communication a three-spurred form of this orchid was described in which the additional spurs were derived from the modification of the lateral sepals, and the case was, therefore, one of false peloria. In the present paper an example of *Platanthera* is described showing *true* peloria–all the spurred organs being of the inner or petal series. All the flowers on the spike are transformed. The spurs in some of the flowers are of unequal length, and the limbs or blades are a little unequal in size and shape. In other flowers the three spurs and three blades are almost uniform in size and shape. This appears to be the first record of lip-peloria with spurs. The specimen was found in the neighbourhood of Bath. The paper concludes with a reference to some similar observations on *P. bifolia* by Mr. S. Sommier of Florence.—*R. B.*

Platanthera chlorantha Custor var. **tricalcarata Hemsl.** By W. Botting Hemsley, F.R.S. (*Jour. Linn. Soc.* vol. xxxviii. No. 263, pp. 3-5; 1907; 1 plate).—One spike of this three-spurred *Platanthera* was found by Miss D. R. Wilson on the fringe of a wood near Sherborne, Dorset, and sent to Kew.

It presents a very rare kind of metamorphosis: namely, the metamorphosis of the lateral or paired sepals into spurred organs, of which the limb is unlike the lip. Nearly all parts of the three-spurred flower are more or less modified, in response, apparently, to the chief modification. The kind of deviation which this orchid shows has been designated false or irregular peloria, because the parts concerned belong to different whorls: that is to say, two of the spurred organs belong to the sepal series, and one to the petal series.—*R. B.*

Podophyllum, Leaves of (*Bot. Gaz.* vol. xlvii., No. 6, June 1909, pp. 438–444).—Mr. T. Arthur Harris has investigated biometrically the two leaves found on the flowering stem of *P. peltatum.* The degree of lobing was selected for examination and two sets of 400 and 339 pairs respectively were obtained from different localities. The coefficients of variation were between 11·30 and 14·43 and the leaves were therefore rather less variable than leaf characters in general.

The correlations (number of lobes on lower and on upper leaf) were, for one series ·428 and for the other ·468, which resemble the homotypic relationships found by Pearson and others for various leaf characters. The lower leaf has on an average one lobe more than the upper one.

G. F. S.-E.

Potato Culture (*U.S.A. Dep. Agr., Maine,* viii.; June 1909).—A manual of potato culture prepared for the use of farmers in the State of Maine, where potatos form an increasingly important crop. The points touched on include soil, crop rotation, seed, method of planting, manures, cultivation, and disease. Great care in the selection of seed is advised, and diagrams are given showing how to cut the potatos for setting. It is even suggested that the extra labour involved in marking the most flourishing plants among the growing crop to be retained for seed will prove profitable in the long run.—*M. L. H.*

Potato Scab Treatment with Formalin in "Spraying Potatos against Blight and the Potato Beetle." By E. P. Sandsten and J. G. Milward (*U.S.A. Exp. Stn., Wisconsin, Bull.* 168; Nov. 1908).—Where potatos are grown on a limited scale, the seed may be sacked in burlap sacks and soaked, before cutting, in the following solution for 1½ hours: formalin (40 per cent. solution) 1 quart, water 30 gallons. Where it is desired to treat the potatos on a larger scale, the following is more applicable: Crate the potatos, and place in a room of known dimensions, which can be securely closed and fastened. Place 24 ounces of potassium permanganate in a large dish-pan, and pour upon this 4 pints of formalin solution (40 per cent.). Close the room tightly, and leave the potatos exposed for about thirty-six to forty-eight hours. The formaldehyde gas is liberated, and kills the scab fungus without injuring the sprouting power of the seed. The above-mentioned proportion of materials is given for 1,000 cubic feet of space. The proportion should be varied, of course, when a larger space is used. In the rest of the bulletin potato blight and spraying machinery is illustrated and described.—*C. H. H.*

Potato-spraying Experiments in 1907. By F. C. Stewart, G. T. French and F. A. Sirrene (*U.S.A. Exp. Stn., New York, Bull.* 307; December 1908).—There are fourteen statements of cost of spraying. About seventy-five gallons of Bordeaux were applied to the acre at a spraying, costing about 8*s*. The results of 177 experiments show an increase of 50⅓ bushels per acre in favour of spraying with Bordeaux mixture.—*C. H. H.*

Potato-spraying Experiments in 1908 (*U.S.A. Exp. Stn., Vermont, Bull.* No. 142; May 1909; with 4 cuts).—Bordeaux mixtures and lime-sulphur plots gave a 37 per cent. larger yield than did the unsprayed plots, while Bordeaux twice applied yielded 67 per cent. more, and that applied four times 141 per cent. more than did the unsprayed plots.—*M. C. C.*

Potatos, Comparative Yield from English, Scottish and Irish Seed (*West Scot. Agr. Coll., 9th Ann. Rept.* 1909, p. 109).—Three varieties "Ninetyfold" (early), "British Queen" (mid-season), and "Up-to-Date" (main-crop), were grown, seed being obtained from England, Scotland and Ireland. The seed of any one variety unfortunately did not weigh the same on the respective plots, the Irish seed being in most cases considerably the heaviest, but the numbers of tubers set (or cut sets) was the same in each case. The weight set and the total yield is shown in the following table, but the report should be consulted for the weights of the tubers of different sizes.

	English Seed.				Scottish Seed.				Irish Seed.			
"Ninetyfold."	t.	c.	qr.	lb.	t.	c.	qr.	lb.	t.	c.	qr.	lb.
Weight of seed . .	1	0	3	0	1	6	1	0	1	6	1	0
Yield per acre . . .	5	5	1	4	9	16	2	20	10	15	2	9
"British Queen."												
Weight of seed . .		18	0	0		16	2	0	1	0	0	0
Yield per acre . . .	15	5	0	25	13	5	1	0	14	9	2	4
"Up-to-Date."												
Weight of seed . .		15	2	0		14	2	0	1	1	1	0
Yield per acre . . .	14	17	0	26	15	6	0	21	14	19	0	8

F. J. C.

Potatos, Effect of planting Sprouted Tubers on Yield. By Prof. R. P. Wright (*West Scot. Agr. Coll., 9th Ann. Rept.* 1909, p. 101). The yield from sprouted and unsprouted seed planted in alternate rows was compared, the varieties grown being "British Queen," "Up-to-Date," "Langworthy" and "Scottish Triumph." The returns show the result of one year's trial only, but in the case of every variety the yield from the sprouted tubers was greatly above that from the unsprouted, and the indications are that the increase is greatest in the late varieties. *F. J. C.*

Primula Bulleyana (*Gard. Mag.* No. 2899, May 22, 1909, p. 403; fig.).—A handsome, hardy species from Western China; colour rich golden-yellow, outer side orange.—*E. B.*

Primula Forrestii (*Gard. Mag.* No. 2895, April 24, 1909, p. 325). —An excellent illustration of this new handsome Chinese Primula.

E. B.

Primula Littoniana (*Gard. Mag.* No. 2906, July 10, 1909, p. 528; fig.).—A distinct Chinese species. Flowers rose-lilac; calyces deep red. *E. B.*

Primula obconica gigantea. By C. H. Arranger (*Le Jard.*, vol. xxiii. No. 530, p. 84; March 20, 1900; 3 figs.).—This variety (syn. *P. Arendsi* Pax) was a cross between *P. obconica* and *P. megasaefolia*, and M. Jobert has now succeeded by selection in obtaining an even finer plant, *P. obconica gig.* race *Jobert.* The flowers, in every shade of rosy pink, are more than 5 cm. across. The plant is fairly hardy in southern climates; elsewhere it requires a greenhouse.—*F. A. W.*

Primulas, Hardy. By W. Irving (*Garden*, May 15, June 5, 12, 19, and 26, July 10 and 31, 1909, pp. 243, 278, 289, 399, 313, 338, and 374).—A series of articles in which the writer gives a useful description of some 65 forms and directions for their cultivation.—*H. R. D.*

Prunus japonica. By J. Hutchinson (*Bot. Mag.* tab. 8260).—Nat. ord. *Rosaceae*; tribe, *Pruneae.* China and Japan. Shrub; leaves ovate-lanceolate, 2–2¾ inches long; peduncles 1–3-flowered; petals obovate, ⅓ inch long, rose-pink; drupes globose, bright red, ⅔ inch diameter. *G. H.*

Prunus maritima. By J. Hutchinson (*Bot. Mag.* tab. 8289).—Nat. ord. *Rosaceae*; tribe *Pruneae.* E. N. America. Shrub, 4–5 feet high cultivated, 12 feet wild; leaves obovate, 1¾ inch long, serrate, umbellate; corymbs short, 10 or fewer flowered; corolla ½ inch across, white.—*G. H.*

Prunus tomentosa. By W. T. Macona (*Le Jard.*, vol. xxiii. No. 538, p. 216; July 20, 1909; 1 fig.).—This hardy cherry has been introduced into Canada from Northern China, Manchuria, and Japan. The fruit looks and tastes much like the common cherry. Seed was procured from the Arnold Arboretum, Jamaica Plain, Mass., U.S.A. Those raised on the experimental farm at Ottawa and transplanted in 1900 began to bear in 1903. Being a low shrub, and the fruit grown almost on the ground, the buds are mostly protected by snow from frost. The flowers are white or pink, developed on last year's wood, and nearly sessile. At Ottawa, where the common cherry will not flourish, since the temperature often falls too low, the fruit ripens at the end of July. The habitat of *P. tomentosa* extends from the Orange region to the limit of the Oaks. The fruit is round and smooth, bright crimson; tender, juicy; small oval stone almost free; pleasant, slightly acid, and astringent flavour; very good for preserving.—*F. A. W.*

Pyrethrums, Large-flowering. By R. Rouhaud (*Le Jard.*, vol. xxiii. No. 535, p. 168; June 5, 1909; coloured plate).—These varieties all originate from the *Chrysanthemum roseum* Lindl., or *Pyrethrum roseum* Linn., which came from the Caucasus. Mr. Rouhaud gives a long list of single and double Pyrethrums, and remarks on their being still comparatively uncommon in gardens. They are best divided in the autumn, every two or four years, since the clumps tend to die out in the middle. They do not flower so well with spring division.—*F. A. W.*

Pyrus Pashia var. **Kumaoni**. By O. Stapf (*Bot. Mag.* tab. 8256).—Nat. ord. *Rosaceae*; tribe *Pomeae*. Himalaya. A tree of small to medium size; leaves ovate, 2–3½ inches long, 1¼–2 inches wide; corymbs (umbellate) many-flowered; corolla ¾ inch across, white.—*G. H.*

Pyrus Ringo. By O. Stapf (*Bot. Mag.* tab. 8265).—Nat. ord *Rosaceae*; tribe *Pomeae*. Japan. Small tree; leaves elliptic-ovate, 1½ inches long; corymbs 2–6 flowered; petals pinkish-white, 1¼ inc across; fruit ovoid, 1¼ inch long, yellow.—*G. H.*

Ramondia Nataliae. By E. Wocke (*Die Gart.* p. 533, November 20, 1909).—An alpine of recent introduction from the Serbian Balkans, with large close-growing evergreen, hairy leaves, forming a rosette, and numerous large rosy-lilac flowers. Perfectly hardy and easily grown in peaty soil in a cool, shady, and moist spot among rocks.—*G. R.*

Ramondia pyrenaica alba. By E. J. (*Garden*, July 31, 1909, p. 374.)—The plant never appears to such advantage as when on the nearly vertical face of a wall. The seedling forms are variable, the petals often assuming a pinkish tone. Anything approaching root dryness causes the leaves to shrivel.—*H. R. D.*

Rhododendron Augustini. By M. Girard (*Le Jard.*, vol. xxiii., No. 534, p. 158; May 20, 1909; 1 fig.).—A low-growing hardy rhododendron introduced from China by M. Vilmorin in 1898. It flowers in the middle of May. The foliage is distinct, with russet patches on the under surface; flowers 7–10 in terminal umbels, 5 cm. in diameter, rosy white, the upper portion spotted with deep yellow; limb elongated, deeply five cleft; calyx segments hardly 2 mm. long. Suitable for rock work on the front of a rhododendron bed. It is easily raised from seed, in a cold frame, in spring, in well-drained pans filled with peat and sand; the seeds should be barely covered with mould. Dust the pans with charcoal, to keep down mosses and Marchantias, or better keep in the dark for several weeks till the seeds have germinated. When the leaves are visible transplant into small pots, and keep in a frame, protecting them for the first winter, after which they can be planted out. They will always, however, need a sheltered position.—*F. A. W.*

Rhododendron coombense. By W. B. Hemsley (*Bot. Mag.* tab. 8280).—Nat. ord. *Ericaceae*; tribe *Rhododendreae*. China. Shrub, densely branching; leaves oblong-lanceolate, coriaceous, 1¼–1½ inch long; corolla 1¼–1½ inch across, pale purple.—*G. H.*

Rhododendron kamtschaticum (*Die Gart.* p. 551, November 20, 1909).—Although quite a common Siberian shrub this is not often met with in gardens. The reason of its scarcity is, no doubt, that it requires quite different treatment from other Rhododendrons. It should be grown in full sun, and treated more as a bog plant, in loam and peat or ordinary peat with sphagnum. It is deciduous and grows from 6 to 18 inches in height and has large deep purple or crimson flowers, usually two or three together. It was first figured in Regel's *Gartenflora* in 1887, p. 593. To keep it from growing too early in the season it is advisable (if the snow cover is wanting) to lay boughs lightly over the plants during the winter months.—*G. R.*

Roots, Oxidizing Power of (*Bot. Gaz.* vol. xvlii., No. 5, pp. 355 388, May 1909).—Messrs. Schreiner and Reid have conducted a series of very ingenious experiments which show that roots are able to excrete enzymes ("largely if not entirely peroxidase") and are therefore able to oxidize organic substances in the soil. This oxidizing power is most energetic in that part of the root where roothairs occur, but is also found in the primary meristem and at those spots where secondary roots are developing. The rootcap does not usually produce these enzymes nor does the older part of the root. Some soil extracts show a slight power of oxidation in the absence of plants. In some extracts of poor and unproductive soils, substances occur which interfere with the oxidizing action of roots. These bodies may be sometimes removed by treating with an absorbing agent such as lampblack or by distillation. The oxidation was most vigorous in extracts of productive soils. Fertilizers such as nitrate of soda accelerate the process of oxidation and may even enable the plants to overcome the effects of the poisonous organic substances, which latter interfere seriously with the oxidizing activity of the roots. The reader must refer to the original paper for details as to the chemical methods employed.—*G. F. S.-E.*

Rose, White Killarney. By A. L. Squire (*Le Jard.*, vol. xxiii. No. 538, p. 216; July 20, 1909).—This lovely rose, which compares with Frau Karl Druschki and Kaiserin Augusta Victoria, has been produced by the Waban Rose Company, U.S.A. It is said to be hardier than Killarney, with larger and more perfect flowers and bigger petals. Bud greenish white, cream or ivory when expanded.—*F. A. W.*

Roses, Cross Fertilization of. By Walter Eastlea (*Garden*, July 31, 1909, p. 372).—The writer advises that this should be done under glass, the seed parents being grown in pots; the flower to be fertilized is to be denuded of its petals when in the bud stage, before the pollen is formed. After fertilization the bloom is enclosed in a paper bag for two or three weeks. The seeds will hang on the plant till November, when they should be gathered and placed in pots of damp sand until sown, which should be done in December, the seedlings appearing in two or three months.

H. R. D.

Roses, New. By P. Described and illustrated with figures.

'Mme. Mélanie Soupert';	*Garden*,	April 10, 1909,	p. 177.
'Rhea Reid'	,,	April 17, 1909,	p. 191.
'Wedding Bells'	,,	April 24, 1909,	p. 203.
'White Killarney'	,,	May 8, 1909,	p. 229.
'Lyon Rose'	,,	June 5, 1909,	p. 276.
'Juliet'	,,	August 7, 1909,	p. 386.

H. R. D.

Roses, Old. By A. von d. Heede (*Le Jard.*, vol. xxiii. No. 539, p. 229 ; August 5, 1909).—There are now some 12,000 varieties of roses, and of these only thirty-seven seem to have been known in 1803, and are enumerated in the "Dict. d'Hist. Nat.," whence the author has compiled his interesting notes on "Les Roses du Temps jadis."—*F. A. W.*

Roses, Sickly (*Jour. Soc. Nat. Hort. Fr.*, June 1909, p. 370).—It occasionally happens that old-established roses show evident signs of exhaustion and yet do not respond in any way to the action of the ordinary forms of manure. It has been proved by chemical analysis that magnesia is a most important element in their composition, and this being almost entirely deficient in some soils, dressings of either sulphate or nitrate of magnesia at the rate of 100 to 200 grammes per square metre have been attended on such soils with excellent results.—*M. L. H.*

Roses, Spring Planting of. By P. (*Garden*, April 10, 1909, p. 177.)—The writer describes how he planted some thousands of roses with success as late as the middle of April. The elements of success are that the soil be trenched in advance, the roses procured and heeled in during February or March, and if necessary lifted and heeled in afresh in order to stop root action. Before planting the plants are cut back to two or three eyes, and the roots dipped in thick mud puddle. Plant rather deeply, and if the weather be dry water in a fortnight, pick off all buds till July, after which they may be allowed to develop, and will give flowers in August and autumn. This method will do for Teas, H. T.'s, Polyanthas, and Chinas, but H. P.'s do not do well when planted so late.

H. R. D.

Rubus canadensis. By R. A. Rolfe (*Bot. Mag.* tab. 8264).—Nat. ord. *Rosaceae* ; tribe *Rubeae.* E. N. America. Shrub unarmed or occasionally slightly prickly ; leaves 3–5-foliate ; flowers white, 1 inch diameter ; fruit $\frac{5}{8}$ inch diameter, purple.—*G. H.*

Saxegothaea and Microcachrys, Cones of (*Bot. Gaz.* vol. xlvii., No. 5, pp. 345–354, May 1909 ; 4 plates).—Professor R. B. Thomson describes the fertile scale and the stamens of these uncommon Conifers, with full anatomical details. The ovules are occasionally on the under surfaces of the lower sporophylls. The author considers that the fertile scale is a simple structure, the homologue of the microsporophyll in both Saxegothaea, Microcachrys and the Taxaceae. There is also a full discussion of the inverse orientation of the sporangial supply in the Cycads and of the ovular bundles in Dacrydium, which are compared with the peculiar arrangements in Saxegothaea and Microcachrys.—*G. F. S.-E.*

Saxifraga Clibrani (*Garden*, May 29, 1909, p. 266, and fig. p. 264).—A new Saxifrage of the mossy section, with red flowers.—*H. R. D.*

Saxifraga decipiens, 'Miss Willmott' (*Garden*, June 12, 1909, p. 189).—Another of the mossy section with pink flowers.—*H. R. D.*

Saxifraga longifolia. By S. Mottet (*Le Jard.*, vol. xxiii. No. 531, p. 100 ; April 5, 1909 ; 4 figs.).—An interesting article on the polymorphism of Saxifrages, pointing out that there is not infrequently more difference between certain species than between established genera, but that these differences are physical and vegetative rather than what the author terms analytical. Such, e.g., are presented by the *Dactyloid*, *Umbrosa*, *Kabschia* and *Aizoon* groups. *S. longifolia*, the most beautiful of the genus, belongs to the Aizoons. Its sterile rosette takes several years to develop into the flowering state, and may have as many as 100 leaves. The development is always vertical. The magnificent flower spike may be over 60 cm. in height and bears hundreds of flowers, which last for more than a month. The ripening of its seeds signals the death of the plant, as this variety never produces the lateral rosettes common to its congeners. Unfortunately the plant is apt to hybridize with others of the genus, and the seedlings too often degenerate. If, however, the central spike be amputated before flowering, auxiliary, lateral rosettes will be developed. *S. Cotyledon* is another lovely species, easier to cultivate. It does not form such close, serried rosettes, but there is free production of lateral buds, and the flowers are very abundant. It is also more hardy than *longifolia*.—*F. A. W.*

Saxifraga Stibnryi. By E. H. Jenkins (*Garden*, May 1, 1909, p. 212).—A rare Saxifrage with closely imbricated rosettes of greyish leaves, similar to *S. Griesbachii*. Flowers of a reddish hue, the glandular pubescent stems being of the same colour tone.—*H. R. D.*

Seedling Trees, To Hasten Fruiting of. By E. Baltet (*Jour. Soc. Nat. Hort. Fr.*, April 1909, p. 289).—A careful and detailed account of the method of cultivation by which the long period of eight to fifteen years which it has hitherto taken seedling pears and plums to attain fruiting age may be appreciably shortened.—*M. L. H.*

Seed Selection. By A. D. Shamel (*U.S.A. Dept. Agr. Year Book*, 1907, pp. 221–236; 5 plates).—A lengthy article showing in a striking manner the greatly raised average secured by stringent seed selection in tobacco and maize.—*E. A. Bd.*

Seed-Sowing and the Cold Weather. By A. D. (*Garden*, March 13, 1909, p. 130).—Attention is called to the advantage to be gained by taking the temperature of the soil to a depth of 12 inches before sowing seeds in spring.—*H. R. D.*

Slugs, A Cure for. By Orange (*Garden*, May 29, 1909, p. 262).—Powdered alum is stated to be an absolute remedy, and less trouble to use than soot or lime (same writer, June 26, p. 311). The alum should be powdered fine and put into a flower-dredger, and sprinkled round (not on) the plants to be protected, or over the border before planting. If put on the plants it does not hurt them, but dries in white patches.

H. R. D.

Smuts. The Loose Smuts of Barley and Wheat. By E. M. Freeman and E. C. Johnson (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bul.* 152, July, 1909; plates).—Two different fungi produce smut in wheat and two others in barley: the smuts dealt with in the present paper are these which form loose masses of black spores in the inflorescences, which are set free *at flowering time*. The fungus in the case of wheat is *Ustilago tritici* (Pers.) Jens., that on barley *U. nuda* (Jens.) Kell. and Sw. Cross inoculations with these two fungi failed to produce the disease, but when the spores were introduced into the flowers of the wheat and barley respectively infection always followed. The fungus, therefore, attacks the embryo in the flower and no infection follows the presence of ripe spores on the seed as it does in the case of the covered smuts of wheat and barley.

Various methods have been suggested for dealing with these smuts and they have been subjected by the authors to trial. The method of roguing met with some success, but it was not entirely successful and was so laborious as to render it impossible to carry out even in a small field. The modified Jensen treatment with hot water gave the most excellent results. The recommendations are briefly as follows (reference should be made to the Bulletin for full details): A seed bed, capable of producing at least twice as much seed as is required, should be selected and well cultivated. The bed must be isolated from all chance of infection by smut spores from a similar crop. The seed to be sown is to be steeped first (in small parcels of about $\frac{1}{2}$ peck in canvas bags) in water at room temperature for five to seven hours and immersed for ten minutes in the case of wheat in water at 54° C. (129·2° F.) and for barley fifteen minutes at 52° C. (125·6° F). It is extremely important that the temperatures should be exactly maintained. Water at 51° C. is ineffective; above the temperatures mentioned there is risk of danger to germination.—*F. J. C.*

Snowdrops from Seed (*Garden*, March 20, 1909, p. 142).—The seed is directed to be sown when ripe in boxes to be left outside. Some will come up the first spring, others not till the second or third. To select the seedlings they should be kept in the boxes till they bloom; the first seedlings will usually bloom the fourth year from sowing the seed.
H. R. D.

Sodium versus Potassium (*Bot. Gaz.* vol. xlviii., No. 2, pp. 98-104, August 1909).—Professor W. J. V. Osterhout shows that so far as their toxic action upon plants is concerned, these salts resemble one another very closely. The method used by this author consists in growing wheat for thirty days in solutions of various proportions of NaCl and KCl, and plotting the results as estimated by the growth of roots. Tables are also given showing the results when magnesium, ammonium and calcium chloride were used along with these salts in varying proportions.
G. F. S.-E.

Soil Bacteria, Effect of Salts upon (*Bot. Gaz.* vol. xlviii., No. 2, pp. 105-125, August 1909).—Mr. Chas. B. Lipman tested the effects of various concentrations of calcium, magnesium, potassium and sodium chlorides upon the ammonifying action of *Bacillus subtilis* (this form is capable of changing 19 per cent. of nitrogen into ammonia within a given time). He found that these salts were toxic in the order given above, the first being the most poisonous and the fourth the least. As regards the higher plants, magnesium is most toxic and calcium least. There is an antagonism between Ca and K, Mg and Na, and between K and Na, which may be of some practical importance. For in the alkali lands, the harmful effects may be due to the preponderance of one of these salts.

The poisonous effects of Mg is, however, increased by the presence of Ca, which is again the reverse of what happens with the higher plants.
G. F. S.-E.

Soil Bacteria, Influence of Depth of Cultivation on. By W. E. King, and C. J. T. Doryland (*U.S.A. Exp. Stn., Kansas, Bull.* 161, August 1909).—The authors found that deep cultivation increased the activity and numbers of bacteria in the soil. These were also dependent to some extent upon moisture and especially upon temperature, but appeared to vary also independently of these factors, possibly owing to the production of by-products. The increase of activity was particularly shown in the amount of ammonia produced. An outline of the methods employed is given.—*F. J. C.*

Soils, Isolation of Harmful Organic Substances from. By O. Schreiner and E. C. Shorey (*U.S.A. Exp. Stn., Bur. of Soils, Bull.* 53; April 1909).—The authors have succeeded in isolating certain crystalline organic substances from soils, of which picoline carboxylic acid and dihydroxystearic acid are both shown to be harmful. Several other crystalline organic substances were found, including a new waxlike body, agroceric acid, and a body belonging to the cholesterol group, agrosterol.

The isolation of these substances lends colour to the idea that infertility may be due to the presence of certain inhibitory bodies of an organic nature as previous investigations have suggested, and these researches into and isolation of definite organic compounds from the soil are important contributions to our knowledge of the causes of infertility.—*F. J. C.*

Soils, The Action of Heat and Antiseptics on. By S. U. Pickering (*Journ. Agr. Sci.*, vol. ii. (1908), p. 32).—The author shows that antiseptics, such as carbon bisulphide, chloroform, ether, benzene, &c., cause chemical action to take place in soils treated with them and increase the soluble organic matter in them. Germination is retarded, just as in the case of heated soils. The different antiseptics differ in the intensity of their action both as regards the amount of organic matter rendered soluble and the inhibitory effect upon germination. After keeping the soil for a time the inhibitory effect is reduced and some of the previously soluble matter becomes insoluble.

The production on heating of a substance inhibitory to germination appears to be a property common to all soils, and the proportion of it formed depends on the increase in the amount of organic matter rendered soluble by heating, but the actual amount of soluble organic matter originally present in the unheated soil is not always a criterion as to the intensity of its inhibitory action.

Soils in their natural condition appear to contain a certain amount of this inhibitory substance, as they appear less favourable to germination than pure water. Rich soils are less favourable to germination than poorer.—*F. J. C.*

Soil, The Effect of Partial Sterilization of, on the Production of Plant Food. By Dr. E. J. Russell and Dr. H. B. Hutchinson (*Jour. Agr. Sci.* iii. (1909) 2, pp. 113–144; 2 plates).—The hypotheses which have been put forward to account for the increased yield following partial sterilization of the soil are briefly reviewed and the authors' own work fully detailed.

It is found that there is a rapid increase in the amount of ammonia in soils partially sterilized either by heat or by volatile antiseptics such as toluene. This increase of ammonia is due to a slight extent, in the first place, to the heating, but the subsequent rapid production to the growth of micro-organisms. There is also an increase in the amount of the unstable nitrogen compounds, but the humus appears to be little affected. There is, if anything, a slight increase, rather than a decrease.

The nitrifying organisms are destroyed below 95° C., and by means of treatment of the soil with toluene, and the soil is rendered unsuitable for their growth. There is therefore no gain in the quantity of nitrates. Neither does there appear to be any gain in the total amount of nitrogen, but rather a small loss in the partially sterilized soil as compared with the untreated soil.

The authors conclude that the increase in ammonia is due not to the removal of any ammonia-devouring agent, but to an increased production of ammonia, for when small quantities of ammonia are added to the soil, they are always recovered either as ammonia or nitrate.

Bacteria increase very rapidly in the partially sterilized soil and at the same time the ammonia greatly increases, the production of ammonia thus appearing to be connected with the increase in numbers of micro-organisms. Further, the increased production of ammonia appears to be due rather to the increased numbers of germs than to any marked change in the bacterial flora, and the conclusion is reached that there is in the untreated soil a factor which limits the multiplication of bacteria, and this factor is destroyed by partial sterilization; this factor may be reintroduced by the addition of untreated soil. Search revealed the presence of large organisms such as infusoria, and amoebae and to these is ascribed the *rôle* of limiting the increase in the number of bacteria in untreated soil, (1) by actually devouring the bacteria, or (2) by competing with them for food, and from their comparatively large size they must prove very active competitors.

Thus partially sterilized soils supply, not nitrates, but ammonia and other nitrogen compounds to plants, and it must be assumed that the plants are able to absorb and utilize these nitrogen compounds.

The paper details the methods of experiment and the results obtained, and must be consulted for these.—*F. J. C.*

Solanum etuberosum. By C. T. Druery (*Gard. Mag.* No. 2908, July 24, 1909, pp. 574).—The results of cultivation of this potato for the last twenty years seem to prove that though in many ways very similar to the common potato it is persistently resistant to disease. The seed from self-fertilized plants, and also from those crossed with the common potato, gave very similar broods, but individually varying.—*E. B.*

Sorbus cuspidata. By O. Stapf (*Bot. Mag.* tab. 8259). Nat. ord. *Rosaceae*; tribe, *Pomeae*. Himalaya. Tree; leaves elliptic, 5–8 inches long; corymbs many-flowered; petals white, villous within; fruit globose, $\frac{4}{5}$ inch across, red wild, reddish-green cultivated.—*G. H.*

Spiraea Henryi. By W. Bean (*Bot. Mag.* tab. 8270).—Nat. ord. *Rosaceae*; tribe *Spiraeae*. Central China. Shrub, spreading habit, 7–8 feet high; leaves $2\frac{1}{2}$–$3\frac{1}{2}$ inches long; flowers white, $\frac{1}{4}$ inch diameter, in compound corymbs, 2 inches across.—*G. H.*

Spiraea Veitchii (*Gard. Mag.* No. 2909, July 31, 1909, p. 598; fig.).—A new June flowering shrubby Spiraea from China; hardy, with long growths of white fragrant flowers.—*E. B.*

Spraying. By F. Cranefield (*Wisconsin State Hort. Soc., Bull.* 15; March 1909).—Gives formulas for insecticides and fungicides. Illustrates and describes spraying machinery, including a gasoline power spray outfit and a geared power sprayer, power being derived from the hind axle of the spray waggon, an excellent type for use in young orchards of large acreage. Under apple scab it says, "the spores of this disease live over winter, adhering to the buds and bark as well as the fallen leaves, germinating at the time the leaves start in the spring." It is evident, then, that the most important spraying for apple scab is in early spring, before the buds open, that we may destroy or prevent the germination of the spores. For this spraying copper sulphate may be used, dissolved in water at the rate of 2 lb. to 50 gallons. The trees should be sprayed again as soon as possible after the blossoms have fallen, and a third time ten days later, using Bordeaux mixture combined with Paris green or arsenate of lead.—*C. H. H.*

Sprays. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S. (*Woburn, Eighth Report*, 1908.)—Experiments with various insecticides on caterpillars (pp. 83–94) have shown a 1 per cent. emulsion of solar distillate made with iron sulphate at a cost of 1*s.* the 100 gallons to be the most effective, though in most cases $1\frac{1}{2}$ per cent. of oil is recommended (see abstract on "Emulsions"). The authors, however, do not feel justified in saying that the insecticide which is the most effective on one species of caterpillar would be equally so on all. The above wash, with the higher percentage of oil, proved one of the most effective against aphis on apple trees (pp. 95–99) when the weather following the application was dry. When there is much apple mildew about it is recommended (pp. 100–102) when spraying for caterpillars in summer to make the above wash with copper sulphate instead of iron sulphate, though the effect of this as regards the mildew is only temporary. For the removal of moss and lichen (pp. 56–57) it was found that 10 per cent. of lime was not an efficient substitute for 2 per cent. of caustic soda, either alone or in an emulsion. Experiments with salt on apple trees (pp. 106–108) showed that a 2 per cent. solution scorched about 10 per cent. of the leaves, while a 5 per cent. solution stripped the trees of leaves; and though the effect of spraying with sea water (2·7 per cent. salt) was as bad, though slower, in its action it is considered probable that the greater part of the damage done to vegetation near the sea is due to wind and not to salt, many plants which flourish near the sea being quite unaffected by spraying with sea water. The bad effect of brine on foliage, as on insect eggs, is held to be due to the osmotic action of the salt. In dealing with the effects of washes generally (pp. 103–107) it is pointed out that repeated treatment with a strong wash may produce injury even when a single dressing appears to be without effect, and that other varieties of apples may be more susceptible to injury than those upon which the experiments were conducted. Though the authors believe that even a 2 per cent. strength of paraffin emulsion may generally be used with safety, yet a 1 per cent. wash caused some scorching when applied at the time the blossom buds were opening. No injury to trees in the dormant state has yet been noticed from the application of emulsions containing as much as 36 per cent. of paraffin (p. 126). A 50 per cent. emulsion and undiluted paraffin were used on apple trees in leaf, and both perfectly destroyed woolly aphis (p. 109) as far as it can be destroyed by treating the branches alone and without lasting injury to the trees, the paraffin causing less injury than the 50 per cent. emulsion. Later experiments in this dangerous practice are detailed in the "Tenth Report" (pp. 13–21), dealt with in the July 1909 "Journal." The nature of the action of insecticides is discussed (pp. 110–113) with reference to the part played by osmosis, and also to the enhancement of the effect produced by two insecticides acting together as compared with the action of either separately, as, for instance, paraffin and caustic soda.—*A. P.*

Stachys grandiflora. By K. Fischer (*Die Gart.* p. 447, Sept 18, 1909).—Notes on this useful, hardy perennial. The plant grows about 2 feet in height. The leaves are cordate and hirsute, and the flowers are violet red, lasting a considerable time. The time of flowering is during the summer months.—*G. R.*

Strophanthus Preussii. By O. Stapf (*Bot. Mag.* tab. 8250).—Nat. ord. *Apocynaceae.* West Africa. A climbing or straggling shrub; stems to 12 feet long; leaves 2–4 inches long and 1½–2 inches wide; cymes terminal in many-flowered corymbs; corolla 1 inch across, yellowish-white, the tube reddish, the tips ending in filiform tails, to 1 foot in length.—*G. H.*

Sulphate of Iron and Apple Scab. By L. Bey (*Pom. Franc.*, June 1909, pp. 167–170).—In an article on copper salts and cryptogams the author concludes by recommending the use of sulphate of iron as a winter spray for apple trees, the boughs of which are infected with apple-scab fungus.—*C. H. H.*

Sweet Potatos. By A. Rodely (*Le Jard.*, vol. xxiii. No. 534, p. 155; May 20, 1909; 2 figs.).—The tubers of *Convolvulus Batatas* are much recommended as a substitute for potatos. They are propagated in March, either by cutting up the tuber, and planting the bits containing an eye, or by planting the whole tuber and striking cuttings. The pots in either case need protection in a frame or greenhouse. The tubers can then be forced on, but this article gives directions for outdoor culture.

Choose a warm spot in the garden, and dig out a patch 1 m. across by 20 cm. deep, which must be filled with fresh manure, watered, and well turned over. Cover this with fine soil, and set the plants in, well in the middle. The pits should be prepared at the beginning of May, and must be 30 m. apart. Pack the plants with well decayed manure and water occasionally.

The tubers must be gathered when the leaves are touched by the first frosts. They will not keep if frost-bitten, but must be quite ripe. Nor will they keep if bruised in gathering, so that they are less easy to manipulate than potatos. They must be well dried, even put in the oven. Then pack them in dry cases, with alternate layers of fine sand and sweet potatos, taking care that the tubers are not in contact. Store in a dry place with even temperature, (3°–5° C. is recommended), and they will keep all the winter. A few cuttings can be struck before the tops are frosted, or some of the tubers may be set aside for propagation.—*F. A. W.*

Tachinae, parasitic on Caterpillars. By Ch. Doublesel and N. D. L. R. (*Le Jard.*, vol. xxiii. No. 536, p. 180 ; June 20, 1909 ; 3 figs.)—An interesting article on the Tachinae, which do good service in attacking the Brown Tail Moth and other foes of arboriculture and horticulture. These flies hover round the caterpillars and lay their eggs in them. The unconscious host pursues its normal existence till, when it changes into a chrysalis, the hungry and now full-grown larvæ consume it entirely, and as many as a dozen flies may issue from the chrysalis instead of a moth.

F. A. W.

Timbers of Dominica (*Jour. Imp. Dep. Agr. W. I.*, vol. ix. No. 4, 1909).—An enumeration of 176 timber trees of Dominica, with their botanical names, usual dimensions, and purposes to which the wood is applied, supplemented by lists of woods suitable for various purposes.

M. C. C.

Timbers of Jamaica. By W. Harris, F.L.S. (*Jour. Imp. Dep. Agr. W. I.*, vol. ix. No. 4, 1909).—An enumeration of 108 timber trees of Jamaica with there usual size, character of the wood, and purposes to which it is applicable. With separate lists of woods suitable for various purposes.

Tobacco, Experiments with Sumatra-Type (*U.S.A. Agr. Exp. St., Pennsyl., Bull.* 89 ; Jan. 1909 ; plates).—An account of the experiments in growing Sumatra-type tobacco for wrapping undertaken at Milton Grove and at Cocalico, in Pennsylvania.

The plants were grown under the shelter of cotton tents stretched on laths, and the results seem to prove that the method is a successful one and should make tobacco-growing quite a remunerative industry in that part of Pennsylvania.—*M. L. H.*

Tomato Fruit Rots in 1907. By V. Worrell Pool (*U.S.A. Exp. Stn., Nebraska*, 1908 ; 10 plates).—This report enumerates the following diseases : (1) black rot, *Alternaria fasciculata* (C. & D.) ; (2) *Rhizoctonia*.

but without conidia or fruiting bodies; (3) ripe rot, or anthracnose (*Colletotrichum lycospersici* Chester); (4) *Fusarium* sp.; (5) *Fusarium solani* (Mart.).

It is recommended that decayed fruit should be burnt, and a thorough application of Bordeaux mixture should be made every two weeks during the growing season.—*M. C. C.*

Turnips, Diseases of. By T. W. Kirk, F.L.S. (*Dep. Agr. Rep. N.Z., Bull.* No. 14, February 1909; with 6 cuts). –Enumerates the following diseases, which severely affected the turnip crop in New Zealand during 1907: attack by the diamond back moth, and afterwards by the turnip phoma rot (*Phoma napo-brassicae*) and turnip mildew (*Erysiphe polygona*). These three causes combined appear to have caused the mischief.

M. C. C.

Tussock Moth in Orchards. By W. J. Schoene (*U.S.A. Exp. Stn. New York, Bull.* 312; January 1909).—This moth does much harm to shade trees in New York State, but apparently at present does but little damage in England. The pamphlet, after describing and illustrating the insect, describes the measures for controlling its attack: namely, collecting egg-clusters, spraying with arsenical sprays, jarring the trees, and banding the trees.—*C. H. H.*

Valeriana dioica (Linn.). **The Forms of Flowers in.** By R. P. Gregory M.A. (*Jour. Linn. Soc.* Vol. xxxix. No. 270, pp. 91–104; 1909. Plate 8).—It appears that the individuals of *Valeriana dioica* may be arranged in classes distinguished from one another by the relative development of the male and female reproductive organs and to some extent by the size of the corolla. The author distinguishes four such groups, viz.:—(1) short-styled male; (2) long-styled male; (3) hermaphrodite; (4) female. Each type, however, is connected with the next in the series by a number of intermediate forms, which so completely fill in the gaps between the types that the latter can only be looked upon as the central forms of the groups in which it is convenient to arrange the various forms of flower.—*R. B.*

Variation. By Charles T. Druery, V.M.H. (*Gard. Mag.* No. 2902, June 12, 1909, pp. 447).—The author deals with this problem, and states how, despite the capacity of differing individually that exists in all species, there is a strong tendency of each individual to adhere to a definite family type, and that, as change of environment probably does not produce permanent variation, mutations are the chief factor. The view that such mutations are purely spontaneous and in no way induced by hybridization is supported by the history of many natural fern sports. The importance of mutations and the part they may play in the evolution of species is referred to.—*E. B.*

Variations of Radishes, Cultural. (*Le Jard.*, vol. xxiii. No. 530, p. 83; March 20, 1909).—M. Molliard has presented a paper to the Académie des Sciences on cultures of radish in a sugar medium. Starting with seeds of red radishes, he has been able to obtain from them red, white, and even black varieties, showing that these (formerly held to be distinct) are merely cultural variations.—*F. A. W.*

Vegetation Affected by Agriculture in Central America. By A. F. Cook (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 145; 1909; plates). —Much has been said about the influence of environment on primitive man. This pamphlet is intended to show how profound and lasting has been the influence of primitive man on his environment. Various facts support the conclusion that the Central American region was once one continuous forest, and yet it may be doubted now whether any truly virgin forest still exists there. Everywhere even in the densest tropical growth you may come upon the ruins and relics of extinct civilizations, civilizations which disappeared not through political changes or sudden catastrophes, but because primitive methods of agriculture reduced great tracts of land inhabited by peoples who lived by agriculture into the condition of deserts, in which agriculture was impossible. Some of these remains point to successive cultivation of the same regions in widely separated ages, and the stages of the long struggle between man and nature may be traced through existing conditions brought about by the methods of Central American Indians to-day.

Forest land is cleared by burning and grubbing, or even by burning alone; corn is planted, and the encroaching grass kept in check by further burning, until the surrounding forest is driven away far beyond the limits of the township. Gradually the climate changes, disastrous erosion of the bare soil takes place, and when finally each community was forced to move on to fresh clearings they left nothing but desert behind them. Left to itself, first coarse grass, then undergrowth, then tropical forest crept back, and in some cases was again denuded at an interval of clearly not less than 2,000 years by another wave of population.

One curious point in the history of these successive changes is that in many lately re-afforested places in Central America the humus-inhabiting Arthropods, which could not survive the heat, dryness, and sunlight of the period of cultivation, have not yet returned to their late home, while such remnants of ancient forests as exist possess a rich humus-inhabiting fauna.

The pamphlet contains many picturesque details and concludes with a note of warning against the harmful tendencies of some present-day systems of American agriculture.—*M. L. H.*

Vegetation of Sandy Seashores. By P. Olsson Seffer (*Bot. Gaz.* vol. xlvii. (1909), No. 2, pp. 85–126; with 12 figs.).—The author details many interesting observations as to air-temperature, air-moisture, analysis of spray from the sea, soil temperature at various depths (ten tables), mechanical analysis and chemical composition of sands, soluble salt contents in coastal sand, &c. He also alludes to the effects of oscillations of the coast line, to the influence of the wind and to man's intervention.

The diurnal range of temperature amounted to as much as 25·6° C. on Finland dunes and 24·3° at Perth, W. Australia.

The influence of the salt spray from the sea was clearly brought out in the case of an Australian Mesembryanthemum which was much taller, and had longer leaves and less succulence in a wind-sheltered position near the beach. On the other hand, the author could detect no difference between specimens from the beach and others grown in the desert hundreds of miles inland. The author finds the amount of salt in the soil inconsiderable except on the surface. "When salt is found it has been deposited as spray from the sea, but this is rapidly washed out by rainwater, and when no precipitation has fallen, the sodium chloride does not come into contact with the ground water but is detained on the surface by the upward movement of the water."

Even on the middle beach there is under the surface a continuous stream of rainwater, which is slowly working its way to the sea, and which, "being lighter than salt water, flows on top of the latter."

"There appears to be a certain maximum amount of salt for every species to which it is very accurately adapted and this maximum cannot be overstepped without fatal results to the plant." Some experiments of the writer show that this maximum varies from 1·9 per cent. (*Potentilla anserina*) to 3·1 per cent. (*Atriplex hastata maritima*). On the other hand, plants from strands with low salinity were more sensitive than those from very salty shores.

The author also found that in patches of *Ammophila arenaria* the soil temperature was almost invariably from two-tenths to six-tenths of a degree higher than when *Elymus arenarius* occupied the ground.

These extracts may give some information as to the scope of this paper. The photographs are for the most part very clear (fig. 10 appears to be upside down).—*G. F. S.-E.*

Viburnum cotinifolium. By B. Othmer (*Die Gart.*, p. 140; March 20, 1909).—A handsome shrub from Nepaul at 2000 to 3000 metres altitude. The leaves are leathery, hairy beneath, the flowers small, produced in umbels and pink tinged. Flowering about the end of May.
G. R.

Vines, Pruning of. By G. Rivière and G. Bailhache (*Jour. Soc. Nat. Hort. Fr.* March 1909, p. 194).—Tables are given, with the analysis of sugar and acid content per litre of must from tested vines, showing that every leaf up to five leaves left above the second bunch of grapes on each fruiting shoot largely increases the sugar and diminishes the acid in the grapes on that shoot. With any number of leaves over five the amounts of sugar and acid remain stationary.—*M. L. H.*

Vriesea regina. By O. Krauss (*Die Gart.*, Sept. 18, 1909, p. 445).—The author figures and describes a remarkable and splendid specimen flowering at the Palmen-Garten in Frankfort-on-Maine. About 30 years ago this plant was acquired under the name of *V. Glazlouana*, and although it grew and developed it never flowered until last year. Seeds of this species were first collected in Brazil by Dr. Wavra, who accompanied Prince Maximilian on a journey to Brazil about the year 1860, and the plant now flowering was raised from these seeds. The specimen figured has a diameter of 2·30 metres and a height of 3·45 metres, and the inflorescence has a length of 1·70 metre. The leaves are nearly 3 feet long and 6 inches broad, bright green beneath and glaucous on the surface. The flowers are large, white, fragrant, reminding one of the Lemon. The floral bracts are extremely bright purple, internally greenish. Dr. Wavra writes in *Les Broméliacées brésiliennes* that he found the species growing in dense tropical forest as an epiphyte or on precipitous rocks, which were most difficult to reach. The real F. *Glaziouana* he considers is only a dwarf mountain form, growing on dry rocks, rarely attaining a height of over a metre.—*G. R.*

Weevils, A List of Parasites of American. By D. Pierce (*Jour. Econ. Entom.* i. (1908) 6. p. 380).—The *Rhynchophora* or weevils are being found of great economic importance and this list of their parasites will be found of very great utility to economic entomologists. A bibliography is appended.—*F. J. C.*

Widdringtonia, Ovules and Embryo of (*Bot. Gaz.* vol. xlviii., No. 3, pp. 161–178, September 1909; with 3 figs. and 1 plate.)—Mr. W. T. Saxton describes the male gametophyte, which is "of the most reduced type yet recorded in the Gymnosperms," the megaspores, prothallus, archegonia, cytology and development of the embryo in *W. cupressoides.* He considers that the genus is quite distinct from *Callitris* and that *Tetraclinis* should be excluded from it. A comparison is suggested provisionally with the Gnetales and especially with the genus *Tumboa.*—*G. F. S.-E.*

Wireworms, New Treatment for. By H. T. Fernald (*Jour. Econ. Entom.*, ii. (1909), 4, p. 279).—Wireworms have proved particularly destructive to maize seed after sowing. The seed was tarred, as is often done to prevent crows from devouring it, and then placed in a bucket with a mixture of fine dust and Paris Green, so that after treatment the corn showed a greenish colour. The wireworms were in every case repelled.—*F. J. C.*

"Woburn, Eighth Report," 1908. By the Duke of Bedford, K.G., and Spencer U. Pickering, F.R.S.—This Report deals entirely with insecticides and fungicides, the aim being to substitute exact quantitative measurements for the more crude and unsatisfactory methods usually adopted. See separate abstracts under "Emulsions," "Bordeaux Mixture," "Mussel Scale," "Adhesive Power of Lime Washes," and "Sprays" generally.—*A. P.*

Woolly Aphis. By L. Chasset (*La Pomologie Française*, pp. 398–400; December 1908).—The silky covering is soluble only in alcohol, ether and strong potash; it is necessary to dissolve this protection without injuring the bark or the leaves.

The following is found to give very good results in destroying the insect:—

Alcohol for burning, or common brandy . .	1 oz.
Nicotine at 15° or 20°	1 oz.
Water	½ oz.

Apply at the time of the fall of the leaf and in summer, with a brush without touching the leaves.

To destroy the Woolly Aphides which winter at the root, place three or four capsules of sulphide of carbon in the ground, close to the stem. March is a good month for this before the insects leave the ground.—*C. H. H.*

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JANUARY 12, 1909.

Mr. GEORGE BUNYARD, V.M.H., in the Chair.

Fellows elected (41).—Mrs. T. Aitken, Miss L. C. Alexander, Miss Antrobus, Mrs. Ashburner, Dr. A. G. Bagshawe, F.L.S., Miss A. L. Baldwin, K. L. Bilbrough, S. Boorman, J. A. Bramley, James Brown, Mrs. Buchan, Mrs. Burns, Mrs. F. Bushe, T. A. Coghlan, W. A. Conway, Miss G. Crewdson, E. E. Curtis, Miss C. I. T. Dalkin, Miss L. Deacon, Mrs. E. C. Eley, Mrs. H. M. M. Foster, G. H. Freeman, Miss E. Gask, J. E. Geoghegan, J. M. Hall, H. J. Harris, C. G. Hayman, A. D. Homewood, Miss I. Horn, Mrs. Campbell Hyslop, Miss L. Knowles, Mrs. K. M. Maginniss, Arnold Morley, Miss L. A. Myers, Miss E. O. Paget, J. A. Pearson, J. A. Pegg, Mrs. T. Phillips Pugh, G. Riley, H. L. Robson, W. Walters, J.P.

Fellows resident abroad (2).—G. Johnson (Queensland), M. Mertens (Belgium).

A lecture was given on "French Gardening" by Mr. C. D. Mackay (see p. 5).

GENERAL MEETING.

JANUARY 26, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., in the Chair.

Fellows elected (65).—J. L. Anstruther, Mrs. Armstrong, Miss F. Barclay-Watson, Miss A. M. Bell, Mrs. T. R. Blurton, Mrs. L. Bonn, F. W. Bowler, C. J. P. Breach, Mrs. R. O. Burnett, Miss M. Calderon, J. A. Christie, T. B. Cope, Miss M. Corbett, Sir James L. Cotter, Bart., Mrs. Thesiger Daniell, C. F. Edwards, C. E. Elers, Miss Gertrude E. Elkington, Mrs. D. H. Evans, Mrs. T. Storar Field, Mrs. John S. Gladstone, Mrs. Gorton, C. Greenway, N. W. Grieve, Mrs. Wollaston Groome, Mrs. L. Gwyther, Lady Hampson, H. P. Harris, A. W. Hart, Mrs. Hilson, J. Wilson Hodges, Miss Hull, W. Inglis-Jones, Mrs. John Ismay, Miss Jeffray, A. C. Jonas, H. G. Jones, Mrs. Devill-Davies, G. H. Laurence, L. Lloyd-Goring, I. McDougall, Mrs. F. Makepeace, Mrs. Blackett Ord,

H. Peacock, D. Pearson, Mrs. E. Pease, C. J. Peat, H. V. Phillipps, H. Ralley, C. D. Richardson, Thomas Rochford, Mrs. H. K. Rutherford, Miss F. C. Sewell, A. J. Shorthouse, C. Castle Sloane, C. Gordon Slater, Mrs. H. J. Sparks, Miss Maxwell Stuart, S. E. Thomas, W. Thomas, Major A. R. Trotter, Miss C. Trower, Sir Augustus F. Webster, Bart., Mrs. W. W. Wiggin, T. Zarifi.

Fellows resident Abroad (2).—Dr. Lidster (Sydney), H. K. Shaw (Calcutta).

Societies affiliated (4).—Colchester Horticultural Society, Hillsborough Gardening Association, St. Albans County Club, Walsley Horticultural Society.

A lecture was given on "A Method of using Domestic Sewage in Horticulture" by Mr. W. D. Scott-Moncrieff (see vol. xxxiv. p. 462).

ANNUAL GENERAL MEETING.

February 9, 1909.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H. [President of the Society], in the Chair.

The minutes of the last Annual General Meeting, held on February 11, 1908, were read and signed.

Fellows elected (68).—T. R. Abbott, Lord Osborne Beauclerk, Miss Burton, Mrs. Herbert Bury, Lady Arthur Butler, Mrs. Richard Cecil, Col. F. W. Chatterton, H. W. Coulson, Miss M. E. Dawson, Lord de Manley, Rev. Ralph W. Doyle, Mrs. Alfred Emmott, Mrs. H. Fandel-Phillips, Mrs. Alan Fullerton, Mrs. James Gibbon, Howard Goodman, F. C. Greville-Smith, Mrs. Somerville Grieve, C. Hales, W. Brabazon Hallowes, Viscount Hampden, Dow. Countess of Hardwicke, Mrs. Harmsworth, A. F. W. Hayward, H. Frankland Hepburn, Lady Heathfield, Mrs. R. Rigby Kewley, Hon. Edith Cunlyfe Lister, Mrs. Leopold McKenna, Capt. J. H. Mander, W. J. Morgan, A. H. Norway, Miss H. G. Nussey, Lady Paget, Piercey Parker, Mrs. W. F. Paul, Rev. S. H. Phillimore, Mrs. Maurice Pope, J. M. Randall, Mrs. Richards, Mrs. Robert Rintoul, Mrs. E. Robertson, Miss Rowney, W. Rowson, John Russell, Henry K. Rutherford, W. E. Sands, F. Pilkington Sergeant, Mrs. F. Schooling, J. Stevens, Mrs. Stern, Lady Vesey Strong, W. Swire, E. E. Thayer, Mrs. Tower, Mrs. Beachcroft Towse, Joseph Turner, T. B. Tutt, Rev. A. Roland Upcher, Mrs. Philip Walker, Miss Warrender, C. Watney, Major G. Watson, R. Wells, Mrs. E. Wightwick, Mrs. J. F. Wilkin, Harold Wilkins, Tansley Witt.

Fellow resident abroad (1).—R. T. Turnbull (Wellington, N. Z.).

Associates (10).—Miss L. M. Allerson, Miss L. B. Evans, Miss J. M. Grover, Harry Hargreaves, Miss E. M. Hickson, Miss N. Kirby, Miss D. Lovegrove, Miss C. S. McLean, Miss K. Steel, Miss M. Swynnerton.

Societies affiliated (3).—Abingdon Horticultural Society, Longfords Valley Horticultural Society, Marden Cottage Garden Society.

The President moved the adoption of the Report, which will be found below. This was seconded by Mr. J. Gurney Fowler and carried unanimously.

The President read the following names of the proposed new Members of Council, Vice-Presidents and Officers. These having been duly proposed and seconded, and the list circulated in accordance with bye-law 74, and no alternative names having been proposed, were declared by the President to be duly elected, viz.—

As new Members of Council.—Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., Sir Daniel Morris, K.C.M.G., V.M.H., Mr. Geo. Bunyard, V.M.H.

As Vice-Presidents.—The Right Hon. Joseph Chamberlain, the Right Hon. the Earl of Ducie, the Right Hon. Lord Rothschild, Leopold de Rothschild, Esq., C.V.O., Baron Sir Henry Schröder, Bart., V.M.H., Sir John T. Dillwyn-Llewelyn, Bart., V.M.H.

As Officers.—Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H. (President), J. Gurney Fowler, Esq., J.P. (Treasurer), Rev. W. Wilks, M.A. (Secretary), A. C. Harper, Esq. (Auditor).

Mr. W. Marshall, V.M.H., and the Rev. W. Wilks, M.A., were each presented with the Veitch Memorial Medal.

The Victoria Medal of Honour in Horticulture was presented to Sir Jeremiah Colman, Bart., and Mr. Charles Ross.

Mr. E. M. Holmes, F.L.S., proposed a vote of thanks to the Chairman, which was seconded by Mr. W. Marshall, V.M.H., and carried with acclamation.

REPORT OF THE COUNCIL

FOR THE YEAR 1908.

The One Hundred and Fifth Year.—The past year, though unmarked by any very important Horticultural events, has been a year of quiet, steady progress for our Society.

Wisley Gardens.—The Wisley Gardens continue to increase in favour with the Fellows of the Society. All branches of work are showing good results, and improvements are being made as time and opportunity allow. The new laboratory is proving of great assistance to the Educational work of the Society, and the result of the first year's work by the students is highly satisfactory, and well repays the Council, the Laboratory Director, the Superintendent of the Gardens, and the other Officers, for the time and labour they have devoted to it. The following report has been received from His Majesty's Inspector :—

Board of Education, Whitehall, London, S.W. :
September 10, 1908.

Wisley School of Horticulture.

Rev. Sir,—I am directed to transmit the following Report of H.M. Inspector for the year 1907–8 on the above-named school :—

"Provision is made for the training annually at this school of about thirty young men as scientific gardeners, and a diploma of the Royal Horticultural Society is awarded to the successful students at the end of the period of training.

"The course of instruction is designed to cover two years, but as yet only the first year course is in full operation. The course is extremely well planned and is carried out by an efficient staff of instructors.

"The Gardens of the Royal Horticultural Society are extensive and contain a very large variety of plants, both in the open and under glass. There is also a very well fitted laboratory, with good equipment for instruction in the sciences bearing on practical horticulture. The laboratory is under the charge of a well qualified and skilled instructor and the students receive a very thorough training in the scientific side of their craft. This instruction has, at present, to be made very fundamental and in some respects very elementary, as few of those admitted to the course of instruction have received a satisfactory training previously in the rudiments of science. When the second year's course is in full operation it will be possible to do some fairly advanced work.

"Originality and thought on the part of the students are encouraged by weekly discussions in the evening, when selected students read papers, which are criticized by the other students, and additional experience is gained by the students in acting on small committees in connection with the arrangements for the Society's shows in London.

"On the practical side students appear to have an unique opportunity of acquiring a knowledge of the cultivation of all the plants that they are likely to meet with in the course of their employment, and those who qualify for the diploma should have no difficulty in securing remunerative posts.

"The Royal Horticultural Society is to be congratulated on the step it has taken to encourage the educational side of the craft."

I am, Rev. Sir,
Your obedient servant,
F. G. OGILVIE.

Rev. W. Wilks, M.A.

It was also very gratifying to the Council to find that in the General Examination in Horticulture open to the whole of Great Britain, the Scholarship of £25 a year for two years offered by the Worshipful Company of Gardeners, was won by Mr. Perry, one of the students at Wisley.

In the local Examination confined to the Students at Wisley, Mr. H. E. Seaton took the first place, and has been appointed Assistant Demonstrator in the Laboratory.

Experiments have been set on foot to illustrate (1) the effect of various methods of planting fruit trees, (2) the influence of pruning and not pruning in the first winter after planting, (3) of summer pruning, (4) the importance of planting trees at a correct depth, and (5) the effect of grass over the roots of fruit trees.

Grape Exhibit.—At the fortnightly Meeting on September 29, an exceedingly fine collection of Grapes grown in the Vineries at Wisley, and comprising 30 varieties, was shown. The Grapes were magnificent, and, at the Council Meeting, Mr. S. T. Wright, the Superintendent of the Garden, and Mr. A. C. Smith, the Assistant Superintendent, were complimented by the President on the excellent results they had obtained.

Contributions of Plants.—Contributions of Orchids have been presented to the Gardens by Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., Sir Jeremiah Colman, Bart., V.M.H., Colonel Holford, C.I.E., C.V.O., W. A. Bilney, Esq., J.P., P. Ralli, Esq., F. Wellesley, Esq., J.P., J. S. Moss, Esq., C. A. White, Esq., J. Sparkes, Esq., Messrs. James Veitch, Messrs. Charlesworth, Messrs. J. W. Moore, Messrs. George Bunyard and Messrs. Sander. It is hoped that these will form the nucleus of a far larger collection in a few years to come.

Visitors.—The number of visitors to the Gardens, admitted by Fellows' tickets during the year 1908, amounted to nearly 11,000 as compared with 8,818 in 1907. This is exclusive of horticultural parties which were admitted by special arrangement, and would increase the total to more than 11,500.

Wisley Trials.—In order to protect the members of the various standing Committees from the possibility of reproach, and to secure absolute freedom from bias, the Council have arranged that in future, when trials are being made at the Gardens, the growing plants, flowers, or fruits, shall be inspected by a Sub-Committee composed of five members of the Committee interested, and that everything so grown for trial shall be kept under a number only, and that the names, both of the varieties and of their senders shall not be disclosed until a decision has been arrived at, and samples are submitted to the whole Committee at Vincent Square, together with the Report and Recommendations of the Sub-Committee. Thus, the judgments of all Sub-Committees at Wisley will be given under number only. Specimens of the produce for which a Sub-Committee shall have recommended any award, will be brought to Vincent Square at the next ensuing Meeting, and the whole Committee will then have an opportunity of considering the Report and Recommendations made by the Sub-Committee at Wisley. The Committee having inspected the samples brought up, and adopted (or otherwise) the Recommendations of their Sub-Committee, will send them up to the Council for its approval in the usual way.

Wisley Tithe.—In 1907 the land tax at Wisley was redeemed; this year the Tithe rent charge has been similarly treated, so that the land is now free from both these outgoings.

A Visit to Windsor.—On June 10, by the gracious permission of His Majesty the King, the Council and Committees visited Windsor and the Royal Gardens at Frogmore. As guests of His Worship, the Mayor of Windsor (G. Bampfylde, Esq.), an excellent luncheon was enjoyed in the Guildhall, and after visiting St. George's Chapel, the Albert Memorial Chapel, and the State Apartments, an inspection of the Royal Gardens at Frogmore followed. The Council were much impressed by the admirable cultivation and order displayed in all departments of the garden, and desire to express their great thanks to Sir Dighton Probyn, V.C., G.C.B., and to Mr. Mackellar, His Majesty's Head Gardener, for the kind way they received the visitors.

Deputations.—In response to invitations received, Deputations from the Society attended the Flower Shows of Truro, York, and Newcastle, and were in each City most cordially and hospitably received by the gentlemen responsible for the arrangements. The Council have, with much pleasure, accepted invitations to send Deputations in 1909 to Birmingham and to Cardiff, and negotiations are in progress relating to another important Horticultural Meeting.

Deputation from the French Horticultural Society.—On June 23, one hundred Members of the Société Nationale d'Horticulture de France, with their President, Monsieur Viger, and their Secretary, Monsieur Chatenay, were received by the President and Council, and after visiting the day's Flower Show they were entertained at a luncheon in the Lecture-room.

Shows in 1908.—During this year 34 Exhibitions, covering 41 days, have been held by the Society.

Temple Show.—The 1908 Spring Show in the Inner Temple Gardens, now held there for 21 consecutive years, was again a great success, and the thanks of the Society are due to the Benchers. The Private View, from 7 to 12 on the second day, arranged for the exclusive benefit of Fellows, was much appreciated, judging by the number of Fellows who availed themselves of the privilege. The Benchers have again kindly consented to the 1909 Show being held in their Gardens.

The Summer Show.—By the very kind permission of Mary, Countess of Ilchester, the Society's Summer Show will be again held at Holland House in 1909. The 1908 Show was even more magnificent than in preceding years, but the second day was unfortunately wet.

Colonial Fruit Shows.—Shows of Colonial Fruit have been held in March, June, and November.

The November Show was a great success, the applications for space far exceeding all that was available. The Rt. Hon. Lord Strathcona and Mount Royal, G.C.M.G. (who, in the unavoidable absence of the President, was received at the entrance by The Rt. Hon. Lord Balfour of Burleigh, Sir Albert Rollit and other Members of the Council), performed the Opening Ceremony, when a Hall filled with magnificent fruit—Apples and Pears from British Columbia, Nova Scotia, and Ontario; Citrus and rare tropical fruits from the West Indies; and fruits and preserves from other Colonies—was displayed before the Fellows and the public. Lord Strathcona testified to the value of the work which the Society is doing for the Colonies, and at the private Luncheon given to the Agents-General, and presided over by Sir Albert Rollit, many were the marks of appreciation as to the value of these Shows to the Colonies, and their stimulating influence on the great fruit-growing resources of our Daughter States.

Spring Bulb Show.—In the coming year March 9 has been fixed for a show of Forced Spring Bulbs, with a view to specially demonstrating which varieties of Daffodils, Hyacinths, Tulips, &c., are best suited for forcing. Exhibits of large or small collections are invited from amateurs and the trade. Medals will be awarded according to merit.

Fruit Shows.—In consideration of the facts (1) that the Annual Autumn Show of British-grown Fruit is every year practically a repetition of the previous year's Show; and (2) that many British-grown fruits cannot possibly be shown (or shown in perfection) at any one Show of fixed date; and (3) that Vegetables have been somewhat neglected in the past; the Council have decided to omit the great Autumn Show for one year, and in 1909 to substitute in its place a series of somewhat similar prizes for British-grown fruit and vegetables, but spread over the whole twelve months, so that everything may be seen at its best. Prizes will therefore be offered at every "Fortnightly" Show at Vincent Square during 1909, the Schedule of which will be published on February 25 in the Society's "Book of Schedules," price 6*d*.

Affiliated Societies Challenge Cup.—In connection with these fortnightly prizes the Council offer a Challenge Cup to be competed for by Affiliated Societies, hoping thereby both to stimulate the interest of the Societies concerned, and also to bring them into somewhat more intimate touch with the Parent Society. The Cup will be held for one year, and a Silver-Gilt Medal awarded to the Society winning the Challenge, and also to the Society obtaining the second place in the contest.

New Life Fellow.—Sir Daniel Morris, K.C.M.G., V.M.H., the Treasurer of the Society during the financially difficult years 1888 to 1891, has been appointed an Honorary Life Fellow of the Society in recognition of the great assistance he has rendered to Horticulture in various parts of the world.

Editorship.—Mr. Geo. S. Saunders, F.L.S., having resigned the Editorship of the Journal, owing to ill health, Mr. F. J. Chittenden, F.L.S., the Director of the Laboratory at Wisley, has been appointed his successor.

Journals.—Four parts of the *Journal* have been issued to the Fellows during the year. To secure a more frequent circulation of the Proceedings of the Society and of other information, the new Editor has been requested to publish the *Journal* in quarterly, or four-monthly, parts. The smaller and more frequent issues will undoubtedly prove more acceptable to the Fellows for general use.

Bequest.—The Council very much appreciate and acknowledge with warmest thanks an intimation they have received from Lady Macleay of her intention to bequeath to the Society the very valuable gift of a complete copy of Curtis's Botanical Magazine. They venture to express a hope that it may be several years yet before it comes into their possession.

Examinations.—The following Examinations have been held during the year:—

1 and 2. The General Examination, which is intended as a test of general horticultural knowledge. It was held in two sections, (*a*) for

candidates of 19 years of age and over, and (*b*) for those under 19 years of age. In 1909 the age limit in both sections will be 18 instead of 19.

3. The School Teachers' Examination in Cottage and Allotment Gardening.

4. The Public Parks Examination—designed for men engaged in the Parks and Gardens of Municipal and other Public Authorities.

The number of candidates at each of these examinations was large, and the results were very satisfactory.

Examinations Abroad.—On the invitation of the Government of the United Provinces of India, the "General Examination" of the Society in the Principles of Horticulture is to be slightly modified so as to fulfil the local Indian requirements, and a first examination will be held in April 1909 at Saharanpur. This suggests that possibly other countries and districts may feel it desirable to enter candidates for similarly modified examinations, in which case the Council would be prepared to organize them.

The examiners are leading horticulturists in England, and for examinations abroad they will be assisted by experts acquainted with the special horticultural conditions of the various countries desiring to adopt the Society's tests.

Lectures.—Twenty-five Lectures have been delivered before the Fellows during the year, and the Council extend their hearty thanks to those who have so kindly assisted in this very useful section of the Society's work.

The Masters' Lectures.—Fellows will remember the intimate connection with the Society of the late Dr. Masters, F.R.S., who did much for horticulture by drawing constant attention to the various ways in which scientific discovery and research might be made serviceable to gardening; and it will also be remembered that a fund was established by subscription to perpetuate his memory in connection with the Society, and to carry on in some degree his work of science in relation to gardening.

"The Masters' Lectures" have accordingly been founded, and the first two are to be given during 1909 by the well-known Professor Hugo de Vries, of Amsterdam, on (*a*) "Masters' 'Vegetable Teratology'" (June 22), and (*b*) "The Production of Horticultural Varieties" (September 28).

The Nicholson Memorial.—The Council have been requested to raise a fund for the establishment of a permanent memorial of the late Mr. George Nicholson, V.M.H., F.L.S. With this they most cordially agree. There are few, if any men, to whom the present generation of gardeners owes a deeper obligation than to the author of "The Dictionary of Gardening," a work which "has done more towards the standardization of plant names and developing an interest in horticulture than anything published since Loudon," in 1829.

Mr. Nicholson was for many years a most valued member of the Scientific Committee of our Society. He also took a very active part and keen interest in the re-establishment of examinations by the Society, and himself acted as one of the examiners. It is in view of this last point and after carefully estimating the amount likely to be subscribed, that the Council propose to established a "Nicholson Prize," to be awarded annually to the students at Wisley.

Subscriptions should be sent addressed "The Nicholson Prize Fund, R.H.S. Office, Vincent Square, London," and cheques and postal orders made payable to "The Royal Horticultural Society," crossed "London and County Bank."

The Darwin Centenary.—The Centenary Celebration of the birth year of Charles Darwin is to be held at Cambridge on June 22, the date curiously coinciding with the 50th anniversary of the publication of his "Origin of Species." Representatives of Universities and other learned bodies, together with distinguished individuals, have been invited by the University of Cambridge to take part in the festival, and the Rev. Prof. George Henslow, M.A., V.M.H., has been appointed to represent the Royal Horticultural Society.

Classification of Daffodils.—At the request of the Daffodil Committee the Council appointed a Committee to consider the best way of avoiding the confusion, and consequent disputes, likely to arise from the recent multitudinous crossing, recrossing, and intercrossing of the old Divisions of Magni- Medio- and Parvi-Coronati. The Committee have delivered their Report instituting an entirely new system of classification, which the Council have accepted, and ordered to be used at the Society's Shows. The Report contains a list of every Daffodil known to the Committee, together with the name of the raiser as far as it could be discovered, each flower known being allotted to its appropriate class. The Report has been printed in a handy book form, and can be obtained from the Society's Office, Vincent Square, at a cost of 1*s*. Experience may probably suggest some further modification of the new classification, which, for the present, has been experimentally adopted.

Colour Chart.—Hardly a gardener or florist exists who has not at times longed for a COLOUR CHART—that is to say, for a standard of reference whereby he could himself name, or recognize, or convey to a friend at a distance, the *exact* shade of colour of a flower he desired to procure or had seen advertised, or wished to describe to a friend.

The Council have long felt the need of such a chart, but the expense of producing it has hitherto deterred them from issuing it.

Not long since a most admirable chart, containing more than 1,450 shades of colour between white and black, was published in France at the instance of the French Chrysanthemum Society, the price in England being £1 1*s*. net, and, by it, it is now possible to *exactly* recognize, or describe to a friend or purchaser at a distance, the precise colour of any possible flower.

Recognizing both the excellence and the usefulness of this chart, the idea at once occurred, Could it not be adopted as an International Standard, so that all lovers of flowers all over the world could accurately and exactly describe to one another (no matter how far away or speaking what language) the colour and shade of any particular flower they refer to? There seemed no other difficulty than the somewhat prohibitive cost of £1 1*s*. net. By undertaking to be responsible for a very large number, the Society is now in a position to offer this Chart to its Fellows at the reduced cost of 14*s*. 6*d*., for which price it can be obtained at the Society's Offices, Vincent Square, or it can be sent free by post for 15*s*.; but in all cases a cheque or postal order must be sent beforehand.

The Council hope that Fellows will avail themselves of this offer, as unless a large number of copies are purchased a considerable loss will accrue to the Society.

The 1909 Code of Rules for Judging.—The Society's Code of "Rules for Judging" has again been carefully revised and many alterations and additions suggested by the last few years' experience have been adopted. The Council cannot too strongly recommend a careful perusal of the Code (price 1*s*. 6*d*.) to the Secretaries of all local shows and their exhibitors.

Conference on Spraying.—A useful and important Conference on the spraying of Fruit Trees was held on October 16, when papers were read by Mr. Geo. Massee, V.M.H., Mr. H. F. Getting, Mr. F. V. Theobald, M.A., and Mr. Geo. Hammond, to whom the Council are greatly indebted. They also desire to acknowledge with thanks the Chairmanship of Colonel Warde, M.P., and Colonel Long, M.P., at the morning and afternoon sessions. Discussions followed the various papers; and the full text of the Conference will be found in the Society's Journal, Volume xxxiv., Part 3.

Obituary.—Each year removes from the Society's list of Fellows names which have appeared for a long succession of years, and by their removal the Society is so much the poorer. We are no longer able to record the Fellowship of the late Duke of Devonshire, whose tenant the Society was for so long at Chiswick; The Earl of Annesley, a past Member of the R.H.S. Council; Mr. Martin R. Smith, V.M.H., the prince of modern Carnation growers; Mr. Geo. Nicholson, V.M.H., F.L.S., for many years Curator of Kew, a member of our Scientific Committee and one of our Examiners in Horticulture, and the author of "The Dictionary of Gardening"; Sir Henry Lawrence, Bart., Sub-Treasurer of the Inner Temple; Mr. Henry Balderson, for years a Vice-Chairman of the Fruit Committee, and Mr. R. Lye, a member of the same Committee at the time of his death. Amongst other missing names are those of Sir William B. Avery, Bart., the Hon. Mrs. Barton, Major-General H. P. Bishop, Dr. E. Bonavia (of the Scientific Committee), the Dowager Marchioness of Conyngham, the Marquis E. de la Valette, Lady Farquhar, General Sir Reginald Gipps, K.C.B., the Dowager Lady Loder, Colonel Sir William T. Makins, Bart., Lieut.-Col. John Moore-Brabazon, the Earl of Rosse, F.R.S., the Hon. Mrs. E. Stanhope, Sir Condie Stephen, K.C.V.O., C.B., Mrs. Towrey White, Sir F. W. Wigan, Bart., Frau Ida Brandt, the Marquis de Wavrin, the Rev. F. Paynter and Mr. E. Fison.

Retiring Members of the Council.—Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., Mr. George Bunyard, V.M.H., and Mr. A. H. Pearson retire from Office. The first two have allowed themselves to be re-nominated. It is with great regret to the Council that Mr. A. H. Pearson, who has occupied a seat at the Council Table for 10 years, finds himself unable to continue in office any longer. He has, during those years, done excellent work for the Society, and deserves the warmest thanks of the Fellows.

Victoria Medal of Honour.—During the past year two vacancies in the roll of the Victoria Medal of Honour have occurred (through the loss of Mr. R. Martin Smith and Mr. George Nicholson), and Sir Jeremiah Colman, Bart., and Mr. Chas. Ross have been appointed by the Council to this distinction.

New Certificate.—Of late years the want has been increasingly felt of some way of recognizing skilful scientific work amongst plants. Even if such work does not immediately result in any great Horticultural advance, it may either disclose the steps by which existing results have been attained, or it may lay the foundation and prepare the way for future development; and is, in either case, deserving of the Society's recognition. To meet this want the Council have created a New Certificate, to be called "The Certificate of Appreciation."

Annual Progress.—The following table will show the Society's progress in regard to numerical strength during the past year:—

LOSS BY DEATH IN 1908.

		£	*s.*	*d.*
Life Fellows	13	0	0	0
4 Guineas	2	8	8	0
2 "	40	84	0	0
1 "	75	78	15	0
	130	£171	3	0

LOSS BY RESIGNATION, &c.

		£	*s.*	*d.*
4 Guineas	1	4	4	0
2 "	107	224	14	0
1 "	489	513	9	0
Associates	22	11	11	0
Affiliated Societies	27	28	7	0
	646	£782	5	0
TOTAL LOSS	776	£953	8	0

FELLOWS ELECTED IN 1908.

		£	*s.*	*d.*
Hon. Members	5	0	0	0
4 Guineas	6	25	4	0
2 "	601	1,262	2	0
1 "	589	618	9	0
Associates	42	22	1	0
Affiliated Societies	32	33	12	0
Commutations = £197 8*s.* 0*d.*	8			
	1,283	£1,961	8	0
Deduct Loss		953	8	0
NET INCREASE IN INCOME		£1,008	0	0

New Fellows, &c.	1,283
Deaths and Resignations	776
NUMERICAL INCREASE	507
Total on December 31, 1907	10,000
Total on December 31, 1908	10,507

The Council are pleased to record that the total number of Fellows, Honorary or Corresponding Members, Associates and Affiliated Societies is now 10,507, which is believed to be the highest number belonging to any British Royal Society.

Letting of the Hall.—The Annual Revenue and Expenditure Account indicates the continued success of the Hall as a financial asset. No fewer than 52 engagements (excluding the Society's own Shows), covering a total of 160 days, have been accommodated, and the amount

Dr. ANNUAL REVENUE AND EXPENDITURE

	£	s.	d.	£	s.	d.
To ESTABLISHMENT EXPENSES—						
Ground Rent	690	0	0			
Rates and Taxes	590	12	4			
Water Rate	83	12	9			
Electric Lighting	217	14	4			
Gas	30	9	6			
Insurance	49	19	9			
				1,662	8	8
Salaries and Wages	1,750	17	0			
Printing and Stationery	817	16	0			
Postages	406	19	11			
Fuel	48	12	6			
Architect and Auditor's Fees	117	4	2			
Gratuities	9	4	0			
Repairs and Renewals	251	19	4			
Miscellaneous Expenses	304	10	6			
Horticultural Unions	13	0	0			
				3,720	3	5
„ JOURNAL, PRINTING AND POSTAGE				2,606	10	9
„ PAINTING ORCHID PICTURES				38	5	0
„ WISLEY SCHOLARSHIP GIVEN BY THE SOCIETY				25	0	0
„ LINDLEY LIBRARY				29	2	7
„ SHOWS and MEETINGS—						
Temple Show	752	9	3			
Holland Park Show	629	10	11			
Special Autumn Show	293	3	2			
Colonial Show	79	19	6			
Labour	162	17	8			
Expenses of Floral Meetings and Conferences	97	1	11			
				2,015	2	5
„ PRIZES and MEDALS—						
Awarded at Society's Shows	469	13	5			
Awarded by Deputations at other Shows	150	16	0			
				620	9	5
„ WISLEY GARDENS—						
Rates, Taxes, and Insurances	83	10	10			
Tithe Redemption	250	0	0			
Superintendent's Salary	225	0	0			
Labour	981	8	7			
Trees and Shrubs	11	0	0			
Garden Implements	31	11	11			
Loam and Manure	79	11	11			
Repairs	69	6	3			
Fuel	198	5	0			
Miscellaneous Expenses	170	13	11			
				2,100	8	5
„ COST of GROWING, PACKING, and DISTRIBUTION of PLANTS to FELLOWS				313	5	5
„ LABORATORY, WISLEY—						
Salaries	310	0	0			
Surrey County Council Scholars	22	10	0			
Miscellaneous Expenses	85	11	7			
				418	1	7
„ DEPRECIATION—						
Hall Glass Roof, Furniture, Glass Houses Wisley, and Plant and Materials				499	4	11
„ BALANCE, carried to Balance Sheet				7,867	0	0
				£21,915	2	7

ACCOUNT for YEAR ending DECEMBER 31, 1908. Cr.

	£	s.	d.	£	s.	d.
By ANNUAL SUBSCRIPTIONS				14,277	3	3
„ ENTRANCE FEES				397	19	0
„ DIVIDENDS AND INTEREST				1,063	8	5
„ SHOWS AND MEETINGS—						
Temple Show	1,535	14	0			
Holland Park Show	496	18	0			
Special Autumn Show	38	5	0			
Colonial Show	68	16	0			
Takings at Hall Shows	226	14	2			
				2,366	7	2
„ JOURNALS AND OTHER PUBLICATIONS—						
Advertisements	911	18	6			
Sale of Journals	191	15	2			
				1,103	13	8
„ HALL LETTINGS	2,206	2	9			
Less Labour Expenses	138	7	2			
				2,067	15	7
„ PRIZES AND MEDALS				175	4	9
„ EXAMINATIONS IN HORTICULTURE—						
Amount received in Fees	154	0	0			
Less expended	77	11	1			
				76	8	11
„ WISLEY GARDENS—						
Produce sold	37	0	10			
Students' Fees	68	5	0			
Inspection of Gardens	255	11	0			
				360	16	10
„ LIFE COMPOSITIONS—						
Being amount paid by Fellow now deceased				26	5	0
				£21,915	2	7

Dr.

BALANCE SHEET,

	£ s. d.	£ s. d.	£ s. d.
To CAPITAL FUNDS ACCOUNTS—			
As at December 31, 1907		34,931 5 10	
Received since, Life Compositions	197 8 0		
Less Fees paid by Fellow now deceased ...	26 5 0		
		171 3 0	
Masters' Memorial Fund		273 4 3	
Nicholson Memorial Fund		20 18 6	
			35,396 11 7
„ SUNDRY CREDITORS			366 11 5
„ SUBSCRIPTIONS, &c., paid in advance			615 9 6
„ LAWRENCE TESTIMONIAL FUND			389 0 5
„ WISLEY SCHOLARSHIP—			
Balance December 31, 1907 ...	18 15 0		
Given by the Society, 1908 ...	25 0 0		
		43 15 0	
Less paid to Scholars		25 0 0	
			18 15 0
„ DEPRECIATION AND RENEWALS RESERVE ACCOUNT—			
As at December 31, 1907		979 5 3	
Added this Year		499 4 11	
			1,478 10 2
„ GENERAL REVENUE ACCOUNT—			
Balance, December 31, 1907 ...	41,706 5 11		
Less Bad Debts	12 6 10		
		41,693 19 1	
„ REVENUE FOR THE YEAR, as per annexed Account		7,867 0 0	
			49,560 19 1
			£87,825 17 2

DECEMBER 31, 1908.

Cr.

	£	s.	d.	£	s.	d.
By CAPITAL EXPENDITURE—						
,, NEW HALL AND OFFICES—						
As at December 31, 1907	40,376	15	5			
Expenditure since on New Kitchen, Awning, Lavatory, &c.	573	15	9	40,950	11	2
,, FURNISHING THE HALL AND OFFICES—						
As at December 31, 1907	2,088	5	6			
Expenditure since on Oak Cupboard, Typewriter, and Kitchen Fittings	77	0	11	2,165	6	5
,, DWELLING HOUSES, WISLEY—						
As at December 31, 1907				2,390	5	7
,, GLASS HOUSES AND RANGES, WISLEY				3,295	15	2
,, LABORATORY, WISLEY—						
As at December 31, 1907	1,427	14	1			
Expenditure since on Architect's Fees and New Boiler	200	0	10	1,627	14	11
				50,429	13	3
,, PLANT AND MATERIALS—						
Appliances for Shows	236	11	0			
Fittings, Wisley	58	8	6			
Horse and Cart and Garden Plant, &c.	92	13	6			
Fencing and Wire Netting, Wisley	36	15	0			
Scientific Instruments and Fittings, Laboratory	170	4	5			
Breakable Apparatus, Laboratory	95	2	4	689	14	9
,, SUNDRY DEBTORS				757	0	8
,, INVESTMENTS—						
2½ % Consols, £10,576 3*s.* 11*d.* *cost*	9,960	4	9			
(£2,022 8*s.* 9*d.* of this sum is held by the Society, subject to the provisions of the will of the late J. Davis, Esq.)						
£7 Annuity East Indian Railway, Class B, Williams' Memorial Fund	168	0	0			
3 % Local Loans, £5,800 *cost*	6,006	16	6			
3½ % Indian Rupee Paper, 37,000 Rupees ,,	2,462	14	4			
4 % Canadian Inscribed Stock £2,000 ,,	2,077	11	0			
2¾% National War Loan, £5,108 12*s.* 11*d.* ,,	5,000	0	0			
4 % Canadian Pacific Rly. Co. Consolidated Debenture Stock, £4,632 *cost*	4,999	14	1			
3½ % London County Council Inscribed Stock, £3,000 *cost*	3,020	13	6			
2½ % Midland Rly. Preference Stock, £400 Masters' Memorial Fund	290	13	6	33,986	7	8
The approximate value of these Investments is £31,623 16*s.*						
,, CASH—						
At Bank	436	16	4			
On Deposit	1,500	0	0			
In Hand	26	4	6	1,963	0	10
				£87,825	17	2

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on December 31, 1908.

ALFRED C. HARPER, F.C.A., *Auditor* (HARPER BROTHERS),
Chartered Accountant, 10 Trinity Square, E.C.

January 13, 1909.

received (about £2,067) compares favourably with the year 1907, especially when it is remembered that the former year had two lettings of a value of £700, which have not recurred. The awning over the main entrance, and the kitchen constructed in the basement during the past twelve months, still further improve the comfort of the lessees. Bronze Standard Lamps are also to be erected at the main entrance. There are but few vacant dates left in the year 1909, and a good financial return is again anticipated.

Committees, &c.—The hearty thanks of the Society are again due to the Members of the Committees, the Judges, the Writers of Papers for the Journal, the Compilers of Abstracts, the Reviewers, the several Examiners, and to the many others who, during the past twelve months, have done so much to contribute to the success of the Society's work, and to help maintain the high reputation it holds among the practical and scientific Societies of the World.

By Order of the Council,
W. Wilks, *Secretary.*

Royal Horticultural Society,
Vincent Square, Westminster, S.W.
December 31, 1908.

GENERAL MEETING.

February 23, 1909.

Sir Albert K. Rollit, LL.D., in the Chair.

Fellows elected (61).—Mrs. Harold Agar, F. Barchard, Mrs. H. J. Barnes, Mrs. S. Berkeley, Mrs. Wilfred Buckley, E. Russell Burdon, A. P. Caldwell, F. Carr, Miss C. Champernowne, Miss M. Cotesworth, Mrs. Dewhurst, A. Herbert Empson, Sir R. U. Penrose FitzGerald, Bart., W. Forster, Arden Franklyn, C. Friswell, Miss M. Froude, Mrs. Gartside-Tipping, Edgar Gibson, W. Giles, A. W. Gilmour, F. Green, G. G. Hamilton, Mrs. Herring, Mrs. Andrew Hichens, W. Homewood, Martin Hopkinson, Mrs. Ernest Hutton, Rev. T. Arnold Hyde, Mrs. Jeffcock, Alfred Johnson, C. J. Jones, Mrs. H. S. Kaylor, Miss MacBrayne, Mrs. H. E. Mitchell, Miss Monk, W. S. Murray, Arthur Neeves, Mrs. Peacock, W. Peck, Mrs. Reid, Godfrey E. Reiss, Mrs. Richardson, L. Ridout, Miss P. Scott-Thomson, Mrs. Skinner, Joseph Slinger, Miss J. L. Sleigh, Col. H. H. Smythe, T. S. Stewart-Smith, Mrs. Stirling of Fairburn, Miss C. E. Story, Mrs. Francis Tennant, W. G. Tester, Mrs. Thomson, Mrs. H. H. Turner, Mrs. Waddingham, Mrs. Paul Waterhouse, Mrs. Williams, James Wilson, Richard Windover.

Fellows resident abroad (4).—Miss E. Hoyt (New York), Miss G. Durant Rice (New York), Lieut.-Col. G. Rippon (Burma), R. Seller (Cape Colony).

Associate (1).—C. Stone.

Societies affiliated (3). Bushey Cottage Gardening Society; Stulterheim (Cape Colony) Horticultural Society; Sunbury Horticultural Society.

A lecture was given on "A Camping Tour through Syria to Petra in Arabia" by Mr. Arthur W. Sutton, J.P., F.L.S., V.M.H.

GENERAL MEETING.

MARCH 9, 1909.

Rev. JOSEPH JACOB in the Chair.

Fellows elected (57).—Mrs. W. H. Addleshaw, C. J. M. Adie, J. G. Aikin, Mrs. T. Bayly, E. A. Birch, Hamilton Blanchard, Miss Brocklehurst, Mrs. Boyd Browning, P. Caldecott, W. Camm, L. G. A. Collins, Commander Crease, R.N., G. Cunningham, Mrs. Dale, Miss T. D. Epps, Mrs. W. Freeman, William Freeman, Mrs. R. C. Foster, F. A. Gale, Henry C. Green, R. Strangman Griffin, Leslie Greening, D. G. Guild, Rev. John Hardy, F. G. Henson, M. Davenport Hill, H. Reid Inman, Miss H. E. Ionides, Mrs. Jameson, Godfrey Leach, J. G. Le Marchant, Miss A. Letts, Miss Lowndes, Geoffrey Lubbock, John McHarg, Miss A. Maxwell, F. A. N. Newdegate, M.P., Mrs. C. L. Norman, M. Harcourt Paine, Miss L. Palmer, S. W. Parfect, R. Parish, Miss G. Prideaux-Brune, Sir Henry B. Robertson, E. H. Robertson, H. W. B. Robinson, Mrs. Roxburgh, H. N. Sherwin-White, Mrs. Morton Smith, Thomas Taylor, Mrs. C. Theobald, Alfred Tidy, W. E. Trevethick, Walter Trower, Capt. V. N. Ward, Miss R. Wood, Mrs. Henry Woodall.

Fellows resident abroad (3).—A. Koenemann (Germany), C. F. A. van der Sluys (Guernsey), A. Spencer Watts (Sydney, N.S.W.).

Societies affiliated (5). Boston Park Horticultural Society; Highgate Horticultural Society; Machen Horticultural Society; Nelson (N. Z.) Horticultural Society; Worthing Horticultural Society.

A lecture was given on "Tulips and the Tulipomania" by Mr. W. S. Murray (see p. 18).

GENERAL MEETING.

MARCH 23, 1909.

REV. JOSEPH JACOB in the Chair.

Fellows elected (51).—Sydney E. Bates, J.P., Dr. G. Booth, J.P., Mrs. T. Foyster Bowen, Mrs. R. Bradshaw, Robert Bradshaw, Mrs. Brown, H. Buck, J. Oscar Cheadle, W. Chartres Cock, T. W. Coles, J. Abdy Combe, Charles Cranfield, Mrs. Arthur Davies, Miss A. Debenham, Mrs. H. G. Dowler, Mrs. H. Drake, George E. Dyke, Miss A. Dymes, Lady Ellis, R. G. Fugler, R. S. Geale, Thomas Glass, Lady Grenfell, Mrs. Haworth-Booth, Colonel J. H. Hogarth, Charles Humfrey, F. C. Hunter, E. James, Mrs. J. B. Kennedy, Major J. C. L. Knight-Bruce, Mrs. Lacon-Gordon, G. Lewis, Mrs. Leycester, Mrs. W. Park Lyle, Mrs. H. Victor Macdona, Mrs. Maconachie, Mrs. May, H. Mayne, L. B. Meredith, Godfrey Oakley, Miss Patchett, Lady Kathleen Pilkington, Mrs. J. Holmes Poulter, H. Preston, Mrs. C. F. Rawson, Mrs. Sansom, P. Kerr Smiley, Mrs. E. J. Stannard, Mrs. Stutchbury, Lady Edmund Talbot, Herbert H. Walford, J.P.

Fellows resident abroad (7).—A. A. Benson (Brisbane), Gustave Croux (France), N. C. Ghosh (India), A. Gravereau (France), Miss C. E. Hulbert (Geneva), D. McCullum (Johannesburg), Louis Voraz (France).

Associate (1).—Miss J. Dyer.

Societies affiliated (3).—Brewood Horticultural Society, Doncaster Horticultural Society, Stratford Horticultural Society.

A lecture was given on "Rock Gardens - Natural and Artificial" by Mr. R. Lloyd Praeger, B.A.

DEPUTATION TO THE BERLIN INTERNATIONAL EXHIBITION.

April, 1909.

What may be regarded as the great International Horticultural Exhibition of the year 1909 was held at Berlin in the beginning of April last.

The *Gresse Internationale Gartenbau Ausstellung* was organized by the Royal Prussian Horticultural Society, which deserves to be congratulated on the results of its efforts and the unqualified success of the undertaking.

The building selected for the Exhibition consisted of two lofty halls at the *Ausstellungshallen*, adjoining the grounds of the Berlin Zoological Gardens. These halls are within easy reach of all parts of the City by rail and tram, and have been specially constructed for Exhibition purposes. They cover altogether about two and a half acres. In addition to the extensive floor space there are side aisles, spacious galleries, separate rooms and annexes, affording complete accommodation for all kinds of exhibits, also facilities for visitors to obtain a good general view of the collections, as well as access to all the novelties.

The total amount offered for competitions and prizes by the Society and others amounted to about £3,600.

This was practically the first attempt made in Berlin to hold a great International Horticultural Exhibition. The Royal Prussian Horticultural Society, which undertook charge of it, is a comparatively small Society, numbering about 1,000 members, with a subscription of twenty marks annually (a little over £1). In spite of this, the Exhibition was extremely well organized, and it appeared to receive the hearty support of the leading people throughout Germany. The list of guarantors was strikingly large.

At the invitation of the Council the following countries sent special representatives to be present at the opening ceremony and to take part in the social and other functions associated with it, viz.: France, Belgium, Holland, Sweden, Russia, Denmark, Italy, and Great Britain. The representatives of the Royal Horticultural Society were Sir Daniel Morris, K.C.M.G., V.M.H., and Mr. Harry J. Veitch, F.L.S., V.M.H., but owing to illness Mr. Veitch at the last moment was unable to attend. In addition there were 150 jurors, or judges, to whom was entrusted the onerous duty of awarding prizes and awards in the thirty-one sections of the Show. The following gentlemen officiated as English jurors, viz.: Mr. William Watson, A.L.S., Royal Gardens, Kew; Mr. Stuart H. Low (Enfield); Mr. Louis Sander (St. Albans); Mr. S. T. Wright (Royal Horticultural Society); and Mr. R. Hooper Pearson, of the *Gardeners' Chronicle*.

It was estimated that about two-thirds of the total exhibits were contributed by German horticulturists, and one-third by those of other countries. Great Britain on this occasion was not so largely represented as was anticipated, but the exhibits sent by Messrs. Charlesworth (Orchids), Mr. C. Engelmann, Mr. G. Lange (Carnations), and Messrs. Cannell (Pelargoniums) attracted evident attention. The Winter-Flowering Carnations exhibited by Mr. Lange and Mr. Engelmann were marked features in their class.

The Exhibition was privately visited by their Imperial Majesties the Emperor and Empress on Wednesday, March 31, and it was formally opened to the public on Friday, April 2, by their Imperial Highnesses the Crown Prince and Princess, who, after receiving the several foreign and other representatives, were presented with an address and conducted over the Exhibition by the President and other Officers of the Society.

Before referring to some of the most striking features of the Exhibition, it should be mentioned that the three special Grand Prizes offered for open competition were awarded by a ballot of all the jurors as follows: The Emperor's Grand Prize for the best exhibit of cultural methods to Count Manfred von Matuschka, of Silesia, for a fine exhibit of Winter-Flowering Carnations.

The Crown Prince and Princess' Grand Prize for the best complete group in the Show was awarded to Mr. Adolph Koschel, Charlottenburg, while the Society's large Gold Medal for the best decorative exhibit was awarded to the Dutch Bulb Growers' Association for a large and striking parterre of Hyacinths representing a terrace garden with an area of about 400 square yards with about 20,000 brightly coloured plants in beautiful bloom.

Among Orchids by far the largest and choicest collection was exhibited by Mons. F. Lambeau, of Brussels.

Mr. Otto Beyrodt was the chief German exhibitor of Orchids, while, as already mentioned, Messrs. Charlesworth had a small collection of some of their best varieties, including a striking plant of *Odontoglossum Ossulstonii* with over forty flowers.

There were moderately large collections of Palms, Cycads, and foliage plants. Possibly the finest was that of the Société Anonyme Horticole of Ghent; and "Le Lion" had a fine group of *Cocos Weddelliana*.

The stove flowering plants formed an interesting display. Bromeliads were shown by Mr. Firmin de Smet, of Ghent, whose specimen of *Tillandsia zebrina* was particularly good. The Hippeastrums were in considerable quantity, but, with the exception of the collection from Mr. Voorschoten, of the Hague, they were not equal to those usually seen at the Shows of the Royal Horticultural Society.

As already mentioned, the collections of Hyacinths and Tulips formed a special feature of the Exhibition; and they were probably the most decorative of any, well deserving the Grand Prize awarded them by the general vote of the jurors.

The finest group of Roses was planted out as in a Rose garden, and included standard and climbing plants of all the popular sorts. The chief prize winner was Mr. Adolph Koschel, of Charlottenburg.

Amongst attractive novelties were *Impatiens Holstii Liegnitzia*, a dwarf and very brightly coloured variety; the wonderful collection of varieties of *Gerbera* by M. R. Adnet, of Cap d'Antibes, including pure white, yellow, orange, rose, red, and rich crimson flowers; *Cordyline Bruantii variegata* shown by Emil Vercauteren; a fine form of 'White Pearl' Rhododendron by Messrs. C. B. van Nes & Son; a magnificent group of Azaleas by Mr. T. J. Seidel, of Dresden, which occupied the floor area in the large hall; the several groups of *Primula obconica*, the flowers of which were described as "surpassing in size and colour anything yet exhibited in London"; the large and singularly interesting collections of hardy fruits with thousands of handsome specimens of Apples, Pears, and Quinces in excellent condition for the time of year; and the large exhibits of vegetables, contributed chiefly by Dutch growers.

In addition to the Exhibition briefly described above, on April 7 there was opened another Exhibition, or "Floral Display," consisting of arrangements of flowers bringing into prominence the association of poetical or symbolical ideas with certain classes of plants. A descriptive account of this appeared in the *Gardeners' Chronicle* of April 17, p. 249.

There were several social functions to which the foreign and other representatives were invited and hospitably entertained during their visit.

On Thursday, April 1, the jurors, after completing their arduous duties at the Exhibition, were entertained at luncheon by the President and Officers of the Society. On Friday the representatives and jurors were invited to be present at the formal opening of the Exhibition by the Imperial Crown Prince and Princess. In the evening of the same day the foreign guests attended a performance of Verdi's Opera of Aïda. On Saturday evening the Exhibition Festival Dinner took place at the Chief Restaurant attached to the Zoological Gardens. The President (Herr Malther Swaboda), the Vice-President (Herr A. Brodersen), and a distinguished party "welcomed the guests." Appropriate speeches and responses were made by the representatives of each country. Sir Daniel Morris, K.C.M.G., V.M.H., responded to the toast of "British Horticulture," and expressed his appreciation of the hospitality extended to the visitors from this country. On Sunday and Monday excursions were organized to the Imperial Gardens at Potsdam and the recently established Botanic Gardens at Dahlem.

There is little doubt that this great International Exhibition, whether a financial success or not, will have had a great influence on the development of German horticulture, and thus the main objects of its promoters will be fully achieved. It was the general opinion of the English visitors that such an Exhibition afforded a valuable object-lesson as to the best means of organizing and carrying into effect large undertakings of this kind and ensuring unqualified success.

It is admitted that International Exhibitions can only be occasional events. The expenses involved must always be very considerable, while a prodigious amount of detailed work falls on those concerned as well as the risk of financial loss. There can be no doubt, however, as to the great national value of such Exhibitions. In spite of the admitted eminence of English horticultural practice a well organized and successful International Exhibition held in London in a building sufficiently large and accessible to the general public would be likely to bring before the horticulturists of this country numerous points on which they have still something to learn.

It is well known that at the large Exhibitions held on the Continent there is striking evidence of artistic effects and general harmony, produced with plants that are possibly not of the same intrinsic value as many grown in these islands. If such effects in arrangement could be introduced and generally adopted here, they would add materially to the success already attained by our Exhibitions and prove of great value in promoting the further progress of our national horticulture.

GENERAL MEETING.

April 6, 1909.

Professor G. S. Boulger, F.L.S., in the Chair.

Fellows elected (53).—Miss M. Anderson, Mrs. W. R. Anderson, Miss Bashford, G. E. Booker, E. J. Brook, C. Brown, F. C. Burgess, Mrs. G. Dance, Mrs. De Knoop, W. Denman, R. Adam Ellis, H. M. Farrer, Miss Irene Fergusson, Mrs. G. H. Finch, Mrs. Foyer, R. G. Francis, J. Friedlander, Mrs. Gartside, H. J. Godin, Mrs. G. Gomm, Rev. A. Hankey, Miss M. E. Haviland, Mrs. Hawkes, R. Heywood, A. Holt, Miss A. Hutchinson, Mrs. Jardine, Mrs. Bulkeley Johnson, Miss Keating, Mrs. John Kemp, Mrs. R. B. Knatchbull-Hugessen, Lady Loreburn, Miss M. H. McDonnell, Hon. Helen Macnaghten, Mrs. H. J. Mappin, Mrs. R. Moon, F. W. Mugford, Libert Oury, J. S. Parker, F. W. Parsons, G. Wyatt Peachey, H. M. Phipson, Mrs. G. P. Pierce, W. P. Pinder, Mrs. Prankerd, A. Reiss, Mrs. F. M. Robinson, Mrs. J. Robinson, Mrs. A. A. Steel, T. Stevenson, A. Stunt, Mrs. M. Tristram, Mrs. M. R. Trower.

Fellows resident abroad (2).—R. S. Falcon (British Columbia), S. C. De Udyanvinode (India).

Societies affiliated (3).—Marlow Horticultural Society, Somerset Agricultural Association, Victoria Horticultural Society.

A Lecture was given on "Illustrations of the Effects of the Forces of Growth" by the Rev. Professor G. Henslow, F.L.S., V.M.H. (see p. 9).

GENERAL MEETING.

April 20, 1909.

Mr. George Paul, J.P., V.M.H., in the Chair.

Fellows elected (44).—C. H. Bloom, J. Boulter, Mrs. Allen Brown, Mrs. Ulick Burke, Miss M. Chappell, Rev. L. C. Chalmers-Hunt, W. B.

Christopherson, Mrs. Coddington, John Coutts, C. Luxmore Drew, Hon. Mrs. Duberly, Miss D. R. George, Miss Gorringe, Mrs. J. M. Harrison, Miss D. Heywood, Mrs. G. F. Hodder, C. Henry House, Miss A. L. Howard, Miss J. Howard, Mrs. Jump, Mrs. Hugh Kirk, E. A. C. Lloyd, R. McConnell, H. P. Miles, Mrs. E. Morrison-Bell, Miss M. R. Murray, Mrs. Myers, Miss R. E. Peyman, Mrs. Henry Powell, Mrs. A. Praed, Owen Roberts, T. J. Russell, A. E. Rutter, C. P. Sandberg, Dr. John Scott, Mrs. Slattery, Mrs. W. Sykes, A. Taylor, T. Merchant Taylor, Miss M. Thom, C. Twietmeyer, Mrs. E. F. White, Mrs. E. Wilberforce, Rev. P. T. Williams.

Fellow resident abroad (1).—M. Cumming, B.A., B.S.A. (Nova Scotia).

Associate (1).—S. N. Mukherji, B.A.

Society affiliated (1).—Dartford Horticultural Society.

A lecture was given on "Pansies" by Mr. Eric Drabble, D.Sc., F.L.S.

DEPUTATION TO BIRMINGHAM.

April 22 and 23, 1909.

In response to an invitation from the Midland Daffodil Society a Deputation visited Birmingham on the occasion of the Midland Daffodil Show, held in the Botanical Gardens on Thursday and Friday, April 22 and 23. The Council appointed Mr. H. B. May, Mr. E. A. Bowles, Mr. A. Kingsmill, and Mr. C. H. Curtis to act as the Deputation.

The exhibition was a very fine one both in quality and extent, and everything possible was done for the convenience and comfort of the Deputation. On the eve of the exhibition the Treasurer of the Midland Society, Mr. Robert Sydenham, and Mrs. Sydenham entertained the Deputation and several notable Daffodil raisers to dinner at their home, and at the close of the first day they again entertained the Deputation, together with the Officers and Committee of the Midland Society, and all the exhibitors who were able to stay, at dinner in the Grand Hotel. There was a very large gathering at the latter function, under the presidency of Mr. W. A. Milner.

A short programme of toasts followed the dinner, and in proposing "The Visitors" Mr. R. Sydenham specially welcomed the Deputation. Mr. H. B. May responded, and, as on the occasion of the official luncheon, held in the Botanical Gardens earlier in the day, he expressed thanks for the thoughtful and generous hospitality extended to them, and pointed out that the Council, as representing the parent Society, was ready and willing to do all in its power for the benefit of the Daffodil and Daffodil lovers and raisers, but they had no wish to act as an authoritative body on questions of classification and registration except at the wish and request of those specially interested in these flowers.

In the discussion which followed, the Rev. J. Jacob pointed out the great need of a recognized system of classification for Daffodils, and the equally great need of registration of varieties by an authoritative body.

He defended the New Classification issued by the Royal Horticultural Society, and urged that one flower, accompanied by a written description and a fee of 1*s.* or 2*s.* 6*d.*, would be sufficient for registration purposes, and secure to a raiser the right to use that particular name for that particular flower. He expressed a hope that the Royal Horticultural Society might become the recognized registration authority.

With common consent the meeting did not discuss the classification question, because it was under consideration by an enlarged sub-committee appointed by the Council of the R.H.S.

There was, however, a general feeling that no name should be registered for a Daffodil unless accompanied by at least one flower, a description, and a registration fee, and that the Royal Horticultural Society should deal with the matter.

On behalf of the Council the Deputation made the following awards at the exhibition :—

Award of Merit.

To Narcissus 'Lowdham Beauty.'—A large creamy variety belonging to the Giant Leedsii group, from Messrs. J. R. Pearson, Lowdham, Notts. (Fig. 17.)

Gold Medal.

To Mr. E. M. Crosfield, Cossington House, Bridgwater, for a group of new Daffodils.

To Messrs. Cartwright & Goodwin, Kidderminster, for a collection of new Daffodils.

To Mr. Chas. Dawson, Gulval, Penzance, for a group of beautiful new seedling Daffodils.

Silver-gilt Flora Medal.

To Messrs. Barr, Covent Garden, for new and popular Daffodils.

To Messrs. J. R. Pearson, Lowdham, Notts., for a group of the newer and rarer Daffodils.

Silver-gilt Banksian Medal.

To Mr. H. D. Phillips, Olton, for a collection of newer Daffodils.

To Sir Josslyn Gore Booth, Bart., Lissadel, Sligo, for a collection of Irish-grown Daffodils.

To Mr. P. D. Williams, Caerhays, Cornwall, for new Daffodils.

To Messrs. J. Pope, Kings Norton, for a group of Daffodils.

To Messrs. Bakers, Codsall, Wolverhampton, for an exhibit of alpines arranged in a rock garden.

To Messrs. Sutton, Reading, for an exhibit of Cinerarias and Stocks.

Silver Flora Medal.

To Miss F. W. Currey, Lismore, Ireland, for a group of both new and popular Daffodils.

To Mr. F. H. Chapman, Rye, for newer Daffodils.

Silver Banksian Medal.

To Messrs. R H. Bath, Wisbech, for a group of Daffodils.

To Mr. Robert Sydenham, Tenby Street, Birmingham, for a group of Daffodils, Tulips, and Lily-of-the-Valley grown in moss-fibre in undrained pots.

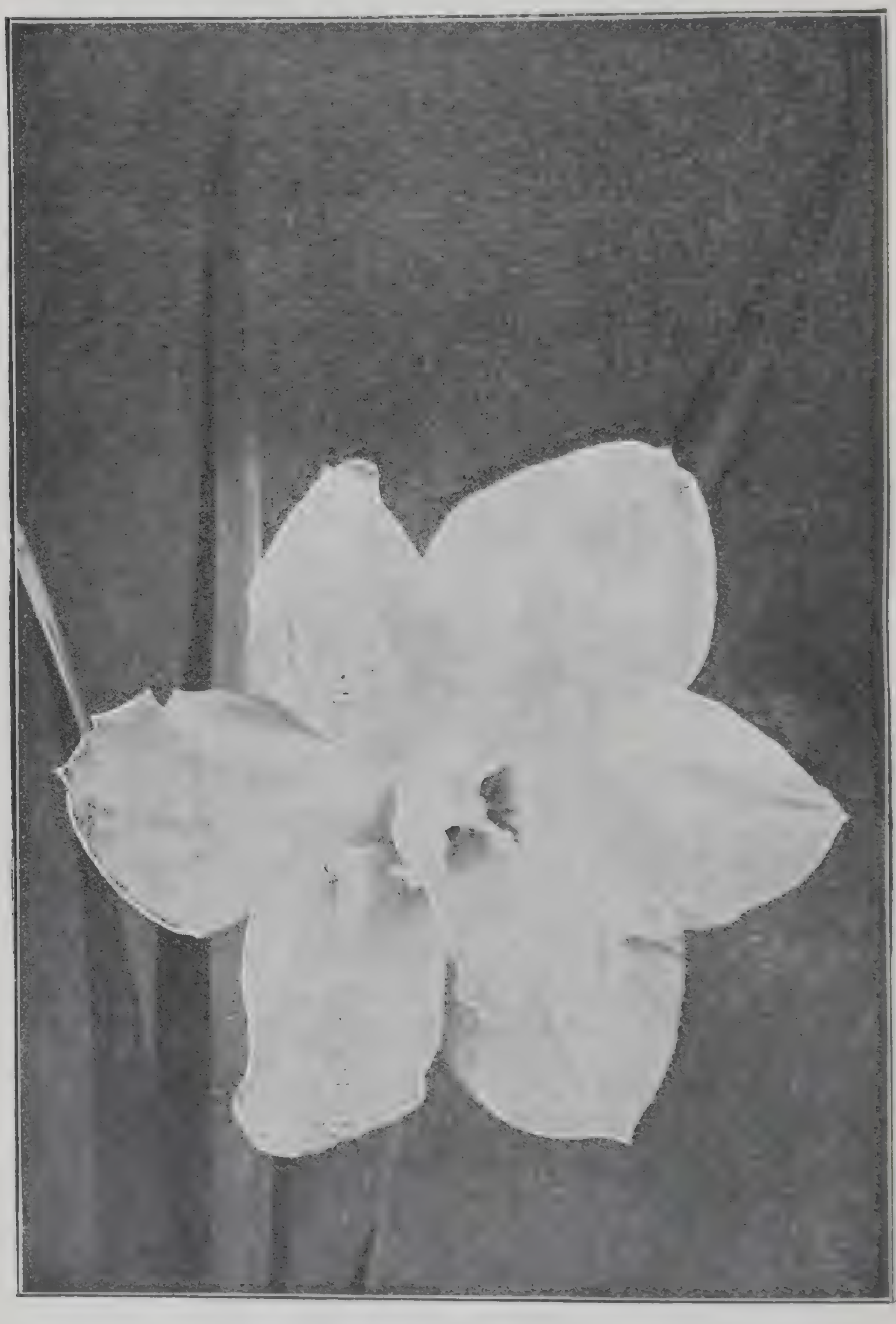


Fig. 17.—Narcissus 'Lowdham Beauty.'

To Messrs. Hogg & Robertson, Mary Street, Dublin, for a group of Tulips and Daffodils.

To Mr. S. Mortimer, Farnham, Surrey, for perpetual-flowering Carnations.

To Messrs. Gunn, Olton, for alpine plants and flowering shrubs.

To Messrs. W. H. Simpson, Birmingham, for a group of Daffodils.

To Mr. H. N. Ellison, Bull Street, West Bromwich, for a group of ferns.

Special Commendation.

To Messrs. Walter T. Ware, Inglescombe, Bath, for bunches of 'Queen of the West' and 'Great Warley' Daffodils.

SPECIAL CLASSES AT THE EXHIBITIONS IN 1909.

[THE FRUIT AND VEGETABLE COMPETITIONS ARE HELD IN PLACE OF THE GREAT AUTUMN SHOW.]

TUESDAY, JANUARY 12.

Class **3.**—Late Grapes, 3 varieties, 2 bunches of each. Amateurs.
First Prize, £3; Second, £2.
No entries.

Class **4.**—Two bunches of one Black Grape. Amateurs.
First Prize, £1; Second, 15*s.*
1. Sir Walpole Greenwell, Bart., Marden Park, Woldingham (gr. W. Lintott).

Class **5.**—Two bunches of one White Grape. Amateurs.
First Prize, £1; Second, 15*s.*
No entries.

Class **6.**—Two Baby baskets, one of one Black, one of one White Grape. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.
No entries.

Class **7.**—One Baby basket of one Grape. Judged for flavour. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.
No entries.

TUESDAY, JANUARY 26.

Class **3.**—Sea Kale, 2 Dishes. Amateurs.
First Prize, 15*s.*; Second, 10*s.*
1. Mrs. Trotter, Dyrham Park, Barnet (gr. H. Juniper).
2. Lord Foley, Ruxley Lodge, Claygate, Surrey (gr. H. C. Gardner).

Class **4.**—Rhubarb, two varieties; 12 stalks of each. Amateurs.
First Prize, 15*s.*; Second, 10*s.*
1. Mrs. Trotter.

Class **5.**—Rhubarb, twelve stalks of any one variety. Amateurs.
First Prize, 10*s.*; Second, 7*s.* 6*d.*
No entries.

Class **6.**—Asparagus, one bundle. Amateurs.
First Prize, 15*s.*; Second, 10*s.*
No entries.

Class **7.**—Salads, four varieties, home-grown. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. Hon. Vicary Gibbs, Aldenham House, Elstree, Herts (gr. E. Beckett).

Class **8.**—Lettuce, 6 heads of Lettuce and 6 of Endive. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

No entries.

Class **9.**—Forced Vegetables, 4 kinds to occupy a space 3 × 3. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY, FEBRUARY 9.

Class **3.**—Dessert Pears, 4 dishes, distinct. Amateurs.
First Prize, £1; Second, 15*s.*

No entries.

Class **4.**—1 dish. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Lord Foley.
2. Mary, Countess of Ilchester, Holland House, Kensington (gr. C. Dixon).

Class **5.**—Not exceeding 6 dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **6.**—1 dish. Trade Growers.
First Prize, Silver Banksian Medal; Second, Bronze Banksian Medal.

No entries.

TUESDAY, FEBRUARY 23.

Class **3.**—Dessert Apples, 4 dishes, distinct. Amateurs.
First Prize, £1; Second. 15*s.*

1. Viscount Enfield, Wrotham Park, Barnet (gr. H. Markham).
2. Col. Borton, Cheveney, Hunton, Kent (gr. J. Whittle).

Class **4.**—1 dish. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Sir Edmund Loder, Maplehurst, Horsham (gr. J. Watkin).
2. H. G. Wadlow, Esq., Marylands, Dogsthorpe, Peterborough.

Class **5.**—6 dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

1. Messrs. James Veitch, Chelsea, S.W.
2. Messrs. W. Seabrook, Chelmsford.

Class **6.**—1 dish. Trade Growers.
First Prize, Silver Banksian Medal; Second, Bronze Banksian Medal

No entries.

TUESDAY, MARCH 9.

Special Exhibition of Forced Spring Bulbs was held. The object was to demonstrate the varieties best suited for forcing, and exhibits of small and large collections were invited from Amateurs and the Trade. R.H.S. Medals were awarded according to merit.

HYACINTHS, TULIPS, AND DAFFODILS. — The Council also offered, subject to the General Rules of the Society, the following Prizes presented by the Dutch Bulb Growers' Society at Haarlem :—

DIVISION I.

For Amateurs.

REGULATIONS.—For Classes 3 and 4, each bulb must be in a separate pot (size optional). Classes 3, 4, and 5, must be all single spikes; no spikes may be tied together. Exhibitors in Class 3 may not compete in Class 4; and all the bulbs must have been forced entirely in Great Britain or Ireland.

Class **3.**—19 Hyacinths, distinct.

First Prize, £6 6*s.*; Second, £5 5*s.*; Third, £4 4*s.*; Fourth, £3 3*s.*; Fifth, £2 2*s.*; Sixth, £1 1*s.*

1. Hon. Vicary Gibbs.
2. L. Noblett, Esq., Monkswell, Wavertree, Liverpool (gr. T. Bushell).
3. The Duke of Portland, Welbeck Abbey, Worksop (gr. J. Gibson).
4. H. S. Bartleet, Esq., Severndroog, Shooters Hill, Kent.
5. The Marquess of Salisbury, Hatfield House, Hatfield, Herts (gr. H. Prime).
6. A. G. Gentle, Esq., Little Gaddesden, Berkhamsted, Herts.

Class **4.**—12 Hyacinths, distinct.

First Prize, £5 5*s.*; Second, £4 4*s.*; Third, £3 3*s.*; Fourth £2 2*s.*; Fifth, £1 1*s.*

1. A Earle, Esq., Childwall Lodge, Wavertree, Liverpool (gr. T. Hitchman).
2. F. Stewart, Esq., Jesmond, Wavertree, Liverpool.
3. Lord Howard de Walden, Audley End, Saffron Walden (gr. J. Vert).
4. E. Mocatta, Esq, Woburn Place, Addleston (gr. T. Stevenson).
5. Mr. G. Dyke, The Gardens, Garston Manor, Watford.

Class **5.**—4 pans containing Hyacinths, 10 roots of one variety in each pan. The blooms of each pan to be of distinctly different colour from those of the other three pans.

First Prize, £4 4*s.*; Second, £3 3*s.*; Third, £2 2*s.*; Fourth, £1 1*s.*

1. The Duke of Portland.
2. Hon. Vicary Gibbs.
3. Lord Howard de Walden, Audley End, Saffron Walden (gr. J. Vert).
4. The Marquess of Northampton, Castle Ashby, Northampton (gr. A. R. Searle).

Division 2.

For Trade Growers.

Class **6.**—Collection of Hyacinths, in pots, pans, or glasses.
Prize, The Gold Medal of the Dutch Bulb Growers' Society at Haarlem.

1. Messrs. Cuthbert, Southgate, N.

Subject to the General Rules of the Society the Council offered the following prizes presented by Mr. Robert Sydenham :—

Classes 7, 8, 9,—*Bulbs grown in moss fibre or similar material* (*not earth*) and without drainage.

Class **7.**—6 single Hyacinths, in separate vases, not exceeding 6 inches in diameter, to be selected from any of the following varieties ; Balfour, General Vetter, Grand Lilas, Grand Maître, Innocence, Isabella, Jacques, Johan, Koh-i-Noor, King of the Blues, La Grandesse, and Roi des Belges.

First Prize, 25*s.* ; Second. 21*s.* ; Third, 15*s.* ; Fourth, 10*s.* ; Fifth, 7*s.* 6*d.*

1. Hon. Mrs. Guy Baring, 16 Cadogan Sq., S.W.
2. Miss C. A. Michell, Oakfield, Cricklewood, N.W.
3. R. Holmes, Esq. Tuckswood, Norwich.
4. Lady Tate, Park Hill, Streatham Common (gr. W. Howe).
5. Mrs. F. Murray, 25 Westbourne Gardens, W.

Class **8.**—6 vases of Tulips (vases not exceeding 7 inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following ; Duchesse de Parma, Dusart, Fabiola, Joost van Vondel, Keizerskroon, Mon Tresor, Prince of Austria, Rose Gris de Lin, Thomas Moore, Van der Neer, Vermilion Brilliant, White Pottebakker.

First Prize, £1 5*s.* ; Second, 21*s.* ; Third, 15*s.* ; Fourth, 10*s.* ; Fifth, 7*s.* 6*d.*

1. Hon. Mrs. Guy Baring.
2. Lady Tate.
3. Mrs. Buxton, Fox Warren, Cobham, Surrey (gr. J. R. Hall).
4. R. Holmes, Esq.

Class **9.**—6 vases of Narcissi (vases not exceeding 7 inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following : Barii Conspicuus, Campernelle, Rugulosus, C. J. Backhouse, Emperor, Frank Miles, Lulworth, Leonie, Mad. de Graaff, Phyllis, Sir Watkin, Victoria, Waterwitch.

First Prize, £1 5*s.* ; Second, £1 1*s.* ; Third, 15*s.* ; Fourth, 10*s.* ; Fifth, 7*s.* 6*d.*

1. Lady Tate.
2. R. Holmes, Esq.

Class **10.**—Cooking Apples, 4 dishes, distinct. Amateurs.

First Prize, £1 ; Second, 15*s.*

1. Sir Mark W. Collet, Bart., St. Clere, Kemsing, Sevenoaks, Kent (gr. M. Nicholls).
2. Viscount Enfield.

Class **11.**—Cooking Apples, 1 dish. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Col. Borton.
2. Hon. Vicary Gibbs.

Class **12.**—Cooking Apples, 8 dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

1. Messrs. James Veitch, Chelsea, S.W.

Class **13.**—Cooking Apples, 1 dish. Trade Growers.
First Prize, Silver Banksian Medal; Second, Bronze Banksian Medal.
No entries.

TUESDAY, MARCH 23.

Class **3.**—Forced Vegetables, 6 kinds. Amateurs.
First Prize, £2; Second, £1 10*s.*

1. Hon. Vicary Gibbs.

Class **4.**—3 kinds. Amateurs.
First Prize, £1; Second, 15*s.*
No entries.

Class **5.**—6 kinds. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.
No entries.

TUESDAY, APRIL 6.

Class **3.**—Salads. 6 kinds; two varieties of a kind may be shown. See 1909 Code, Rules for Judging. § 81 p. 20.
First Prize, £1 10*s.*; Second, £1.

1. Hon. Vicary Gibbs.

Class **4.**—1 basket. Amateurs.
First Prize, 15*s.*; Second, 10*s.*
No entries.

Class **5.**—6 kinds; two varieties of a kind may be shown. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.
No entries.

Class **6.**—1 basket. Trade Growers.
First Prize, Silver Banksian Medal. Second, Bronze Banksian Medal.
No entries.

TUESDAY, APRIL 6.

Class **7.**—The Council have accepted from the Trustees of the Veitch Memorial a Medal and £5 as a prize for the best group of Winter-Flowering Carnations (either in pots or as cut flowers, or a combination of both) staged by an amateur and grown by the exhibitor, and occupying a space of 100 square feet.

1. E. J. Johnstone, Esq,, Burrswood, Groombridge (gr. A. T. Paskett).

TUESDAY, APRIL 20.

Class **3.**—Asparagus, 1 bundle of 100 heads. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

No entries.

Class **4.**—2 bundles of 100 each. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

1. Mr. John Poupart, 'Dovers,' Rainham, Essex.

Class **5.**—French beans, dwarf or climbing, 2 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Hon. Vicary Gibbs.

Class **6.**—Broccoli, 2 dishes, distinct. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

No awards.

Class **7.**—3 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY, APRIL 20.

Class **8.**—Daffodils: Messrs. Barr and Sons have presented to the Society a Silver Cup, valued at £7 7*s.*, as a prize for a group of Daffodil blossoms grown entirely out-doors, Polyanthus excluded, Doubles optional, but must include some of each of the other sections, and must contain at least thirty varieties distinct; at least three blooms of each must be shown. Not more than nine blooms of any one variety may be put up. To be staged in bottles, vases, or tubes not exceeding 3 inches in diameter at the top (inside measurement), and all the stems must touch the water. Quality of flower will count more than quantity, and correct naming and tasteful arrangement will be duly considered. Any hardy foliage may be used, Daffodil or otherwise. No prize will be awarded unless there are three competitors at least. Open to amateurs and gentlemen's gardeners only.

First Prize, The Cup; Second, Silver Flora Medal.

Past winners of this Cup may exhibit, but will not be eligible to receive the Cup more than once in three years. In the event of any such previous winner being adjudged 'first,' a medal will be awarded instead of the Cup, which will go to the next best exhibit, provided that the judges consider it to be of sufficient merit.

No entries.

SCIENTIFIC COMMITTEE.

January 12, 1909.

Mr. E. A. Bowles, M.A., F.L.S., in the Chair, and twelve members present.

Richardia diseased.—A large spathe of *R. ethiopica* was exhibited having about half the outer part brown and dead. Similar brown spots had appeared upon the leaves. No fungus was present, and the Committee thought that, in all probability, the trouble was due to overfeeding.

Malformed Orchid.—From Mr. Lynch, V.M.H., of Cambridge Botanic Garden, came a malformed flower of *Cypripedium Dominianum*, with a normal flower for comparison. The flower had the sepals fused and a double lip.

Diseased Carnations.—Specimens of diseased Carnations were received from Natal, where a very large number of plants had suffered at all stages. These were referred to Mr. Saunders and other members of the Committee for further investigation.

Nomenclature of multigeneric Orchid hybrids.—The Chairman announced that the sub-committee appointed to consider this question had arrived at the decision that the best solution of the question lay in coining names for each of the combinations of genera made, consisting of a commemorative name and the termination "ara." The full text of their finding will be laid before the Committee at an early date.

Parasitic Rose canker.—Mr. Chittenden, F.L.S., showed specimens of the Rose canker described in the Journal R.H.S., Vol. xxxiv., p. 222. The Roses attacked had been imported from Germany three years ago.

Scientific Committee, January 26, 1909.

Mr. E. A. Bowles, M.A., F.L.S., in the Chair, and eight members present.

Diseased Carnations.—Mr. Saunders, F.L.S., and Mr. Douglas, V.M.H., reported that the diseased Carnations shown at the last meeting, had in all probability died through attacks of stem eelworm. The soil used for potting was too light, and the plants were too old to yield the best results. Plants of two years of age were sometimes liable to sudden collapse, and those of a greater age even more liable to fail in this manner.

Grease bands.—Mr. W. Voss reported that no moths had been caught upon grease bands on fruit trees at Enfield since November.

Algae, &c., on sewage sludge.—Dr. Voelcker remarked that mosses, hepatics, and algae had developed upon certain samples of sewage sludge which had been kept at Woburn, but not upon others, which were kept under precisely the same conditions. The samples which contained the greatest amount of lime bore the largest amount and greatest diversity of growth, and it was thought that possibly the difference was as much due to the physical condition of the sludge as to its chemical constitution.

Scilla, &c.—Mr. Worsley showed an inflorescence of *Scilla haemorrhoidalis*, a plant with rather inconspicuous flowers followed by larger, fleshy fruits. He also remarked upon the inconstancy of the arrangement of the spines in certain of the Cacti in various stages and at different ages, and stated that, in his opinion, the arrangement of the spines constituted an insecure basis for the classification of this family.

Fasciation.—From Sir Trevor Lawrence, Bart., came a fasciated specimen of *Anthurium* bearing two spathes and spadices. Mr. E. H. Jenkins sent a fasciated specimen of *Daphne japonica*.

Cattleya Trianaei malformed.—A flower of *Cattleya Trianaei* having three stamens and a much reduced perianth was received from Mr. Gurney Wilson, and referred to Mr. Saunders for further examination.

Varieties of foliage of Cyclamen.—Mr. Bowles showed a large number of leaves of *Cyclamen hederaefolium* from his garden, exhibiting great and wide variation in the arrangement of the markings upon the foliage, especially in the extent of the whitish margin and median blotch which is usually present. He found the variations to be characteristic of, and retained by, the individual plants.

SCIENTIFIC COMMITTEE, FEBRUARY, 9, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, and nine members present, and Mr. Gurney Wilson visitor.

Malformed Orchids.—Mr. Saunders, F.L.S., reported that the flower of *Cattleya Trianaei* referred to him from the last meeting showed three perfect stamens surrounding the pistil, three very short and regular petals, and three sepals shorter still. Mr. Saunders showed drawings illustrating these points.

Albinism in Orchids.—Mr. Gurney Wilson exhibited specimens in illustration of the inheritance of albinism in Dendrobiums. He found that *Dendrobium Murhinianum* crossed with *D. Ballianum*, the former not a pure albino, though pale, the latter nearly white, gave seedlings almost exactly like typical *D. nobile*. *D. nobile album* (*virginale*) which, when selfed, gives quite white seedlings, when crossed with *D. Findlayanum* gives *D.* "Cybele," all the seedlings being alike, and no light forms among them. Similarly, *Dendrobium Wardianum album* crossed with *D. nobile album* gives all coloured flowers. These "reversions" to coloured forms confirm the results that have been obtained in crossing Sweet Peas and Stocks.

Floral proliferation in Cyclamen.—Mr. L. Lawrence (gr. to R. Gregory, Esq., of Shoreham) exhibited a plant of *Cyclamen* showing floral proliferation. The seed was from Lowe's Cyclamen "Salmon Queen," and this was the only plant which had produced such flowers. All the flowers on the plant were alike, and every one had five perfect flowers arising from within the calyx, probably axillary to the sepals, though apparently alternating with them, and surrounding the central corolla, &c.

Hippeastrum pardinum.—Mr. Worsley exhibited flowers of a form which he regarded as belonging to this species. He considered the species to be a variable one, and the form figured in the "Botanical Magazine," t. 5645, not to be the one most commonly met with.

Notonia Grantii.—This interesting Composite with bright-red heads of flowers and Kalanchoë-like in habit, about 3 feet in height, a native of Uganda, was exhibited by Messrs. J. Veitch. It was recommended that a Botanical Certificate be awarded to it. It is figured in the "Botanical Magazine," t. 7691. (Fig. 18.)

SCIENTIFIC COMMITTEE, FEBRUARY 23, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and eighteen members present.

Diseased Parsnips.—A report was received from Mr. Güssow concerning the Parsnips with scabby spots from Mr. Gregory. They were attacked by the fungus *Plasmopara nivea*, which appears first on the leaves. This fungus also attacks Carrots and Parsley.

Malformations in Orchids.—Mr. Gurney Wilson, F.L.S., sent the apical portion of a pseudo-bulb of *Dendrobium nobile* bearing a shoot from which roots had grown as in a vegetative shoot, and a flower, the lateral petals of which were coloured like the labellum. He also sent a dimerous flower of *D. nobile* with the lip suppressed and the two lateral sepals coherent. A *Cypripedium* from Sir Jeremiah Colman having two dorsal sepals was also shown.

Mendelism in Orchids.—Mr. Rolfe, A.L.S., showed flowers the result of crossing *Epidendrum evectum* and *E. xanthinum*. The former of these is purplish in colour, the latter yellow. The first cross gives *E.* × *kewense*, and flowers of this hybrid were shown. Seedlings had been raised from *E.* × *kewense* after self-fertilization, and of these, one which flowered earlier was practically a reproduction of *E.* × *kewense*, while of two others (flowers of which were shown) one showed partial reversion towards the purple *E. evectum*, the other toward the yellow *E. xanthinum*. He also showed the result of re-crossing *E.* × *kewense* with the original parent *E. evectum*, the resulting plant having a purple flower not quite so dark as the parent. Mr. Rolfe said that *E.* × *kewense* re-crossed with *E. xanthinum* gave a yellow flower. Other plants of the crosses had not yet flowered.

Colour changes in Carrots.—Dr. Plowright sent the following note concerning the colour changes occurring in Carrots, together with illustrative specimens. The portion of a Carrot sent is interesting as showing the condition common last year, viz. the longitudinal splitting of the root from the crown downwards, exposing the medullary portion, which shows no tendency to cleave. The exposed portion shows a tendency to development of chlorophyll. On the edges of the cortical portion no chlorophyll is seen, but minute specks, tending to become confluent, of a red colouring matter (carotin) have been freely developed. The specimen sent is of an ordinary garden Carrot; the fissuring of the outer portion is thought to be due to dryness at the time of growth. In the smaller specimen different colour changes have taken place. The exterior has freely developed a green tint mottled with patches of purple. The roots

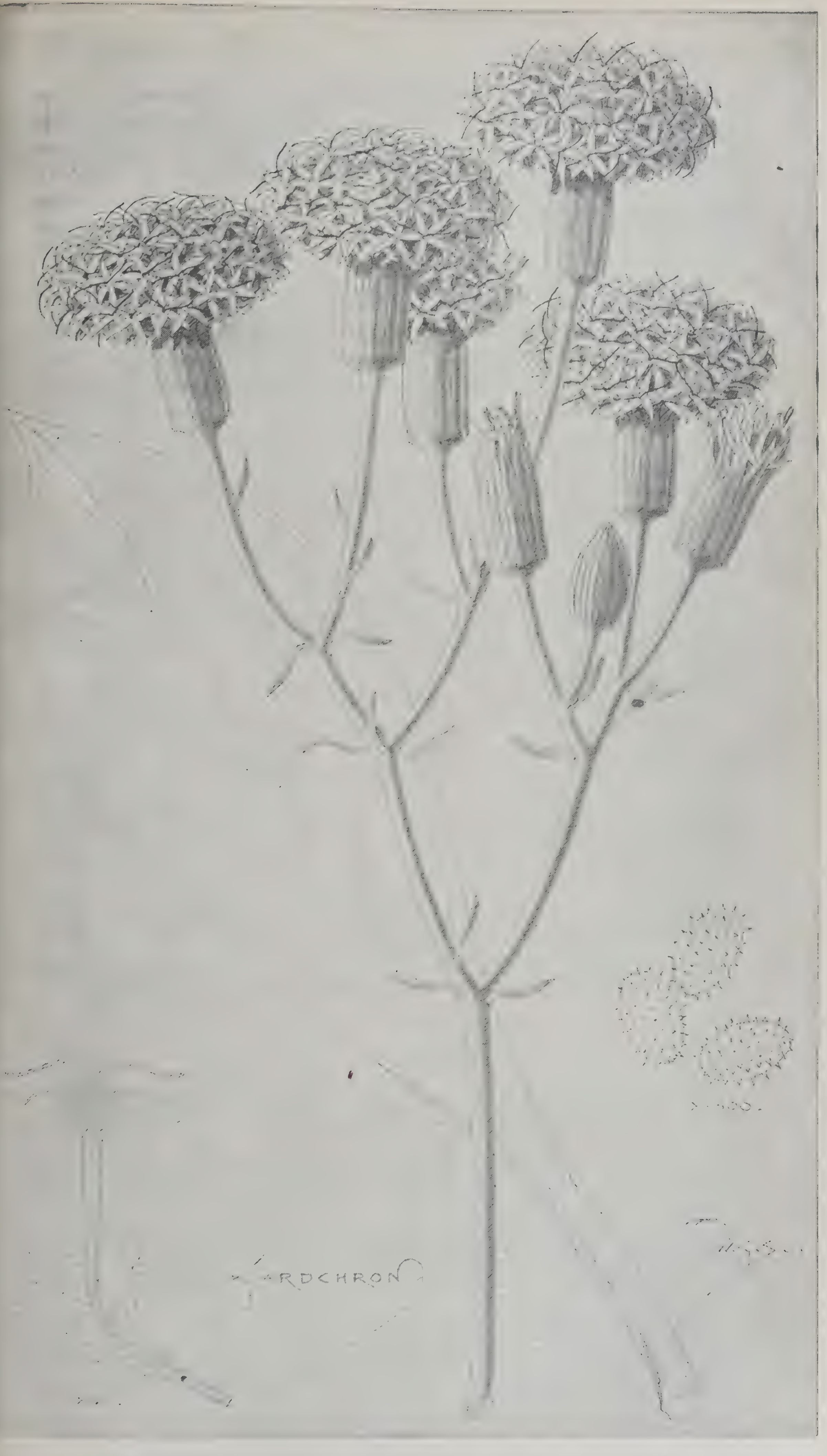


Fig. 18.—Notonia Grantii. (*Gardeners' Chronicle.*) (p. xxxiv.)

have been exposed on the surface of the ground all the winter. The purple is quite superficial. It is interesting to note that this brilliant change has taken place in the least coloured variety, for these small ones are, as a section shows, of the pale variety grown for cattle, and popularly known as "stock Carrots." Incipient colours are often shown in the exposed roots of other plants—for example, blue discoloration—as woad root-stocks are frequently mottled with blue stains when they are pulled and left exposed to the light and air.

Potato tuber diseased.—Mr. Massee, V.M.H., showed a Potato tuber having a black patch (dry scab) about 2 inches square, the result of the attack of the fungus *Stemphylium* (*Phellomyces*) *atrovirens.* This disease has been very prevalent in Scotland this season, and considerable damage has been done to the crop. The present example came from Oxford. The spores are known to remain alive in the soil, and capable of infecting Potatos for several years. Diseased tubers should, therefore, not be used for "seed," nor should Potatos be grown on the same land as that on which the diseased crop was grown.

Apple containing germinating seed.—Mr. F. J. Baker showed an Apple containing germinating seed, and made some remarks upon the result of allowing seed to dry thoroughly before sowing. He considered that seed of many plants which had been allowed to remain as long as possible within the fruit gave better results than seed removed early and kept for some time before sowing.

Variation in Primula sinensis.—Mr. A. W. Sutton, V.M.H., showed a number of plants of *Primula sinensis* having leaves of a shape approaching those of Ivy. He said that occasionally such plants were observed, but they had not until last year set any seed. Seeds had, however, been obtained from three plants last year, and this had given a considerable number of plants with leaves of the form of the parents, and with petals of a very similar form, the form of the latter being apparently correlated with that of the former.

Cinerarias dying.—Mr. James sent a plant of Cineraria, one of about 150 which had died out of some 3,000. It was found that the base of the plant had been attacked by the bulb mite, *Rhizoglyphus echinopus,* in great numbers, and that these had caused the death of the plant.

SCIENTIFIC COMMITTEE, MARCH 9, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and twenty members present.

Beetle in stem of Vanda teres.—Mr. Saunders, F.L.S., reported that he had examined the stem of *Vanda teres,* and found that the beetle boring into it was a species of *Xyleborus,* not a native, nor, so far as could be ascertained, recorded as occurring in Europe up to this time. The plants attacked were sent by Mr. Rogers from a greenhouse at Bury, Lancs.

Spots on leaves of Lapageria.—Mr. Massee, V.M.H., reported that he had examined the leaves of *Lapageria* and found that the roundish brown spots upon them had been caused, not by a fungus, but by a drip.

Orchid hybrids.—Mr. Chapman showed *Odontioda Bradshawiae* "Oakwood var.," raised by crossing *Odontoglossum crispum* var. *Graireanum* with *Cochlioda Noezliana.* The flowers showed no trace of blotching, but were almost of one shade of colour throughout. Another form, *Odontioda Bradshawiae* "Cookson's var." raised from *Odontoglossum crispum* × *Cochlioda Noezliana*, had a deep mauve margin to the brick-red segments, and showed distinctly the deeper coloured blotches upon the lighter ground colour. The difference in colour and markings in these two varieties forms an interesting problem in heredity.

"*Vegetable*" *asbestos.*—Mr. Holmes, F.L.S., reported that he had examined this material, and could find no trace of vegetable structure in it. The substance was creamy-white in colour, and was lamellated, fairly soft to the touch, and resisted fire. Chemical analysis showed it to contain alumina in large quantities, magnesium, calcium, and smaller quantities of sodium and silica. Mr. Holmes considered that the analysis pointed to this being of mineral origin, and not of having been derived from a "Cactus from China," as the sender had suggested. It appeared to be nearly allied to the substance known as "mountain leather."

Bulb on inflorescence.—Mr. Worsley showed an inflorescence of *Lachenalia tricolor* having a small bulb occupying the position of a terminal bud on the inflorescence.

Aberrant Orchid.—From Mr. Miller, of Wisbech, came a specimen of *Cypripedium Pitcherianum* "Williams var.," with a well-formed double lip.

Fasciation in Euonymus japonicus.—Mr. Fraser, F.L.S., showed fasciated branches of *Euonymus japonicus.* The fasciation had followed after severe cutting back of the stem. Numerous buds had started in growth from near where the cut had been made, and among them some had produced fasciated shoots.

Malformation in Tulip.—Rev. J. Jacob sent a flower of Tulip having on the outer side of the mid-rib of one of the perianth pieces two small horn-like growths. The structure was similar in character to those seen in crested flowers, and was apparently the commencement of a crested growth.

Scientific Committee, March 23, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, with thirteen members present, and Messrs. F. W. South and G. Wilson, F.L.S., visitors.

Roots of Sweet Peas dying.—Mr. Massee, V.M.H., reported that he had examined the roots of the Sweet Peas sent to the last meeting, and had found that the cortical cells and root hairs were all killed and browned. He thought they were perfectly free from any disease due to insects or fungi, but had probably been injured by some injurious substance in the soil, or by some fertilizer. Possibly peaty soil with Sphagnum had been used, and humic acid had caused the damage.

Parsnips from wild stock.—Mr. F. J. Baker showed some roots of Parsnips of the sixth generation from the wild plants. The roots were of good size, although grown on poor land, and had lost the greater part of the tough woody fibre of the original stock. In form they showed a near approach to the well-known "Hollow-crown" type of Parsnip. Mr. Baker said there was just a possibility that the plants had in one generation been crossed with pollen from cultivated plants. He found the roots far less liable to rust than the ordinary plants, though they were not entirely free from it.

Orchid malformations.—Mr. Gurney Wilson, F.L.S., showed malformed flowers of *Odontoglossum Harryano-crispum* on behalf of Mr. W. Bolton, of Warrington. There appeared to be no symmetry about the multiplication of parts in these flowers, and Mr. Wilson remarked that, as in the present case, when a portion is removed from an established plant, in the next season it is not very unusual for the older portion to bear malformed flowers, while the portions removed bear normal flowers. He also showed a flower of *Selenipedium caudatum* var. *Lindeni*, from Messrs. Charlesworth. In this variety the labellum is not slipper-shaped as in the type, but is replaced by a very long and tapering petal entirely similar to the two lateral petals; there are also three fertile stamens. The variety was figured by Reichenbach (Lindl. Orchid. 28, 1846), under the name of *Uropedium Lindeni*. The form occurs wild.

Gummosis in Lemon.—Mr. Worsley showed a branch of a Lemon with leaves beginning to shrivel, attacked in its lower portion by gummosis, a considerable mass of gum exuding from the stem, and the bark being browned all round for a considerable distance. It was remarked that in some cases gumming of trees had been found to be associated with the presence of a fungus, and often appeared to start at a wound, but in the present case no wound could be discerned. Sir Daniel Morris, V.M.H., said that in Florida the gumming usually occurred in the trees where they had been budded, and Mr. Fawcett said he had seen trees affected in a manner similar to that shown by Mr. Worsley's example in the West Indies, where the disease was thought to be associated with too liberal manuring with nitrogenous manures, or with heaping earth around the stems. The disease was treated by cutting out the affected portion and dressing the wound with tar.

Eucrosia bicolor.—Mr. Bennett-Poë, V.M.H., showed flowers of this peculiar plant from Miss Willmott's garden. The plant was figured in 1817 in the "Botanical Register," t. 207.

Grease bands.—Mr. W. Voss reported that no winter moths of any kind had been caught on the grease bands placed on the fruit trees at Enfield since the end of November.

Diseased plants.—Mr. Massee, V.M.H., showed a piece of a Rose stock attacked by the fungus *Leptosphaeria* [illegible], a well-known fungus on the stems of the Dog Rose and rarely attacking the cultivated varieties. In this case 13,000 bushes had been affected. Mr. Massee also showed shoots of Apple affected by the winter stage of the Apple scab, *Fusicladium dendriticum*. Mr. Massee also showed a branch of Pear which had been damaged by hailstones in the summer. The wounds had healed, and were now free from danger of attack from fungi, but the circular places which had been damaged by the stones had dried, and were sunken and black.

SCIENTIFIC COMMITTEE, APRIL 6, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., in the Chair, with seventeen members present and Messrs. E. Laxton and J. H. Drummond, F.L.S., visitors.

Gummosis in Lemon.—Mr. Güssow reported that the specimens of Lemon shown by Mr. Worsley at the last meeting had been examined microscopically. "After dissolving the gum in warm water, at each of the places where it exuded a wound was to be seen extending some way into the wood. The injured portions had no connection with each other, but were well defined nearly all round the stem. The distance between the two places where gum was seen oozing out was about 4 inches. The bark was peeled off and some of the gum was transferred with a sterilized needle to a cover glass, and was diluted with distilled water. After drying this preparation it was stained for bacteria, and in every case a large number of bacteria were revealed. The presence of the bacteria does not certainly prove that the gumming was caused by them, but the examination plainly showed that the injury could not have been due to some cause or other within the range of the root. Mr. Worsley kindly sent me the root and stem of the diseased Lemon, and the roots were found to be perfectly healthy, with a good many fibres and small rootlets; the stem just above the root showed near a thorn an injury which, according to additional information from Mr. Worsley, had first exhibited the gumming. The specimen examined was a seedling. It is frequently the case that bacteria gain entrance in the place of grafting, and cause profuse outflow of gum in all kinds of stone fruits. A pure culture of the organisms has been made, and it will be used in infecting a young Cherry tree. The bacteria isolated from Cherries, Plums, and Peaches which showed gumming bore great resemblance to those isolated from the Lemon. The withering and flagging, and the silvery appearance of the shoots and leaves above the place of injury are certainly the natural results of the sap-conducting vessels being clogged by the gum."

Inheritance of character in Pea seeds.—Mr. A. W. Sutton, V.M.H., exhibited a long series of preparations showing the seeds of plants raised by crossing a Pea which he found growing wild in Palestine (? *Pisum arvense*) with forms of the cultivated garden Pea (*Pisum sativum*), and, with bicolor-flowered Peas (*Pisum arvense*), &c. Twenty-two crosses were made in 1907, and four of these failed to produce mature seed in F_1; four died off before flowering in F_1; seven flowered but produced no seeds; seven only produced any seeds in F_2 (the latter were shown on cards 1 to 7). In most cases it would appear that the plants were almost or quite sterile. On cards 8, 9, and 10 were the results of crosses made between the Palestine Pea and *Pisum sativum* by Mr. Darbishire, and grown at Reading. They practically confirm Mr. Sutton's experiments. Mr. Sutton also exhibited a growing plant of the wild Pea from Palestine, and a plant of *Pisum quadratum* (?) grown from seeds received from Kew. This plant much resembles the Palestine Pea in all respects except the foliage. He also exhibited a collection of the various forms of seeds of the garden Pea (*Pisum sativum*), and of bicolor blooming types

(*Pisum arvense*), &c. Among the remaining cards, some which showed that when Improved William 1st, with semi-wrinkled seeds, is crossed with a wrinkled Pea, the resulting types of seed do not follow the Mendelian ratio of 3 : 1, were particularly interesting. This Pea contains starch grains of similar form to those which are found in round seeds, and not of the form found in wrinkled seeds, so that unless the wrinkled character of the seed were unconnected with the form of the starch grains the usual Mendelian ratio could scarcely be expected. Mr. J. H. Drummond contributed a series of specimens from his own herbarium and from the herbarium of the Royal Botanic Gardens, by the courtesy of the Director, showing that the plant Mr. Sutton had collected in Palestine was in all probability *Pisum humile* of Bossier, and not *Pisum sativum* or *P. arvense.*

Wild species of Asparagus and Rhubarb.—Mr. Sutton also exhibited plants of Asparagus, probably *Asparagus filicinus,* and Rhubarb, apparently *Rheum Moorcroftianum,* sent him from the Punjab by a correspondent. The roots of the Asparagus were tuberous, and were no doubt organs in which water was stored. The young leaves of the *Rheum* were cup-shaped, the leaf-stalk springing from the base of the cup.

Hippeastrum hybrid.—Mr. Worsley showed a flower of a deep dragon's blood red, a first cross between the two species *Hippeastrum aulicum* and *H. vittatum.* The flower is of very good form and splendid colour.

Polystichum sp.—Mr. Fraser, F.L.S., showed specimens demonstrating the resemblance between *Polystichum lobatum*, Presl., and *P. Lonchitis*, Roth. If the pinnæ of the latter were lobed or lobulate instead of being merely serrated, the two forms would be closely similar, judging from the size and form of the pinnæ in the two cases. The likeness between *Polystichum lobatum*, Presl., and *P. aculeatum*, Sw., was less obvious.

Seed from S. Africa.—Mr. Holmes, F.L.S., reported that the seed exhibited by Mr. Veitch was *Voandzeia subterranea*, often called Bambarra ground nut, and used in tropical and South Africa as food.

Malformed Orchids, &c.—Mr. Odell showed some malformed Orchids, and some flowers of Auricula wherein the filaments of the stamens were becoming transformed into petals, thus showing the beginning of a double flower.

Dendrobium hybrids.—R. G. Thwaites, Esq., Streatham, sent flowers of *Dendrobium Thwaitesiae* × *D. Wiganiae xanthochilum* and *D. Wiganiae* × *D. Wiganiae xanthochilum*, both being white with a zone of purple on the disc of the lip. He wrote: "Of the first cross three have flowered like those sent, and of the second six plants have flowered. You will notice the pollen caps and stems are also white. I feel sure it would be quite useless to use those flowers for obtaining white hybrids, and it may be that the unsuccessful attempts to obtain white flowers (hybrids from apparently white parents) is due to coloured parentage somewhere behind the flowers used. These and other results, though apparently confusing, may later on assist in throwing light upon the question of albinism, as, notwithstanding the contradictions which are appearing, I feel sure there is some logical law relating to it." *D. Wiganiae* is a hybrid between *D. nobile* and *D. signatum*, *D. Wiganiae xanthochilum* being a seedling out of the same pod, while *D. Thwaitesiae* represents the result of further crossing *D. Wiganiae* and *D. Ainsworthii* (*nobile* × *aureum*). The original parents are therefore either purple or yellow flowers, and the cause of the peculiarity is not apparent.

Scientific Committee, April 20, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, and thirteen members present.

Fatsia injured by gnawing animals.—Mr. Odell reported that he had examined the plants of *Fatsia* in the garden of Mr. Kingsmill, at Harrow Weald, who had sent specimens of the injured stems to be examined by the Committee, and found that the injury had been caused by the long-tailed field mouse, which had gnawed off the bark of some of the branches all round for a considerable length.

Double Auricula.—Mr. Druery, V.M.H., called attention to a double-flowered Auricula of an exceedingly dark purple colour, shown by Mr. J. Douglas, V.M.H. The plant had been raised by Mr. C. B. Green, of Acton, from seed bought of Mr. Douglas. The example was particularly interesting, since Mr. Douglas stated that never before in his experience had a double Auricula been raised from seed of his plants. Sir Daniel Morris, V.M.H., raised the question of whether such a variation as this suddenly occurring from seed could rightly be called a sport. The discussion of the proper application of this term was deferred.

Various plants.—Mr. Worsley showed flowers of Tulips which he had received under the name of *Tulipa Fosteriana* from Holland, and commented upon the amount of variation in colour which these showed, especially in the presence and absence of the dark blotch at the base of the perianth segments. He considered that the plant approached very closely to *Tulipa Eichleri*. Mr. Worsley also offered some remarks upon a plant which he had identified as *Urceolina miniata*, a native of the Peruvian Andes.

From Mr. A. W. Sutton, V.M.H., came an unnamed Composite, apparently a native of Tropical Africa. In appearance the flowers somewhat resembled those of a Cineraria, but did not seem identical with any known species. Mr. Sutton was asked to show the plant again when ripe fruit could also be seen.

Sir Daniel Morris, V.M.H., remarked that he had recently seen, in a garden in the New Forest, a white-flowered shrub about 5 feet or 6 feet in height, which there passed under the name of *Leucopogon Cunninghamii*, but which was really *Spiraea Thunbergii*. He desired to know whether *Leucopogon Cunninghamii* was hardy in England.

Presentation to the Library.—Professor A. H. Church, F.R.S., presented three books which he had had privately printed, being catalogues of some 6,000 manuscripts, scarce pamphlets, &c., contained in the library of the Royal Society, and dating from about 1606 to the beginning of the nineteenth century, containing many interesting references to well-known botanists and other scientific men of this and foreign countries to which

Professor Church briefly referred. Professor Church was heartily thanked for these interesting additions to the library.

Malformed Orchids.—Mr. Gurney Wilson, F.L.S., sent two malformed Cattleyas from the same spike, which had three outer perianth pieces, but the inner were very greatly reduced, the small lip springing from near the apex of the column instead of from the base. Three stamens were present.

FRUIT AND VEGETABLE COMMITTEE.

January 12, 1909.

Mr. Geo. Bunyard, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver Banksian Medal.

To University College, Reading (gr. Mr. C. Foster), for Tomatos, Lettuces and Carrots.

First Class Certificate.

To Pear 'Blickling' (votes, 13 for, 5 against), from Col. the Hon. C. Harboard, Gunton Park, Norwich (gr. Mr. Allen). A January dessert variety which received A.M. January 8, 1907. See Journal, vol. xxxiii. p. lxiii.

Other Exhibits.

Miss Bullen, Awbridge House, near Romsey: Apple 'Kelsey.'
Mr. W. Camm, Cliveden Gardens, Taplow: seedling Apples.
Mr. T. Carter, Butleigh Court Gardens, Glastonbury: Apples.
Mr. A. Dean, Kingston: Apple 'Belle de Boskoop,' A.M. 1897.
Lord Hillingdon, Hillingdon Court: Pear 'Duchesse de Bordeaux.'
Mary, Countess of Ilchester, Holland House: seedling Apple.
Rev. Rollo Meyer, Clophill, Ampthill: Apple 'Grandfather's Secret.'
Mr. H. T. Pewtress, Tillington Nurseries, Hereford: seedling Apple.
Messrs. W. B. Rowe, Barbourne Nurseries, Worcester: seedling Apple.

Fruit and Vegetable Committee, January 26, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mrs. Denison, Little Gaddesden (gr. Mr. A. G. Gentle), for vegetables.

Silver Knightian Medal.

To Messrs. Cheal, Crawley, for Apples.

Silver Banksian Medal.

To University College, Reading (gr. Mr. C. Foster), for forced vegetables.

Other Exhibits.

Hon. A. H. T. de Montmorency, Carrickmines, Ireland: seedling Potatos.

Fruit and Vegetable Committee, February 9, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and twenty-three members present.

Awards Recommended :—

Gold Medal.

To Messrs. Bunyard, Maidstone, for Apples.

Silver Knightian Medal.

To Messrs. Carter, High Holborn, for Potatos.

Silver Banksian Medal.

To University College, Reading (gr. Mr. Foster), for forced vegetables.

Cultural Commendation.

To Mr. J. B. Allen, Osberton Gardens, Worksop, for pods of Vanilla.
To Messrs. Carter Page, London Wall, for forced Seakale.

Other Exhibits.

Colonel Brymer, Dorchester : Pear 'Bergamotte d'Esperen.'
Miss Bullen, Awbridge House, near Romsey : Apple 'Kelsey.'
Mary, Countess of Ilchester, Holland House : Pears.
Mr. F. Paget Norbury, Malvern : Apple 'Jonathan.'
Mr. E. H. Prior, Wisbech : Apples.
Messrs. Redshaw, Bourne, Lincs : Apples.

Fruit and Vegetable Committee, February 23, 1909.

Mr. J. Cheal in the Chair, and fourteen members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To Mr. Poupart, Jnr., Twickenham, for bottled fruit.
To Messrs. Rivers, Sawbridgeworth, for Oranges.

Silver Knightian Medal.

To Messrs. Seabrook, Chelmsford, for Apples.
To O. P. Serocold, Esq., Taplow, for Apples.

Silver Banksian Medal.

To Mrs. Sophia Miller, Marlow, for Orange Jelly and Chutney.

First-class Certificate.

To Apple 'Barnack Beauty' (votes, unanimous), from Mr. A. Poupart, Twickenham. This variety received an Award of Merit as a market variety on March 14, 1899, and is described in the R.H.S. Journal, vol. xxiii. pp. xxxvii, xxxviii. (Fig. 19.)

Cultural Commendation.

To Mr. A. Poupart, Twickenham, for Seakale.

Other Exhibits.

C. Coombe, Esq., Cobham: a Citron fruit.
Rt. Hon. Lord Hillingdon, Uxbridge: Apple 'McIndoe's Russet.'

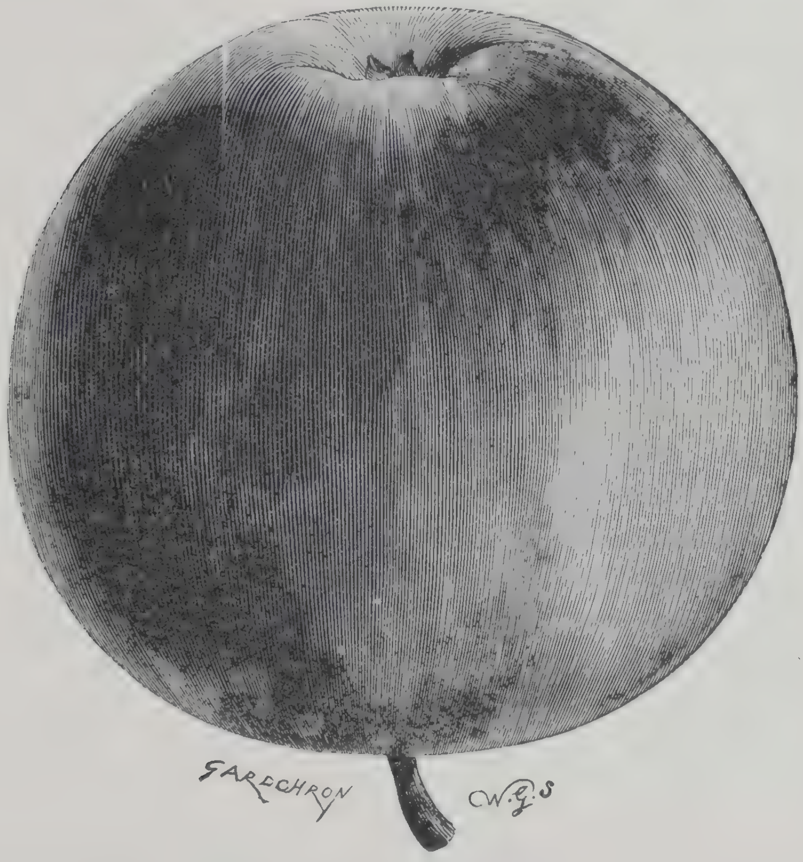


Fig. 19.—Apple 'Barnack Beauty.' (*Gardeners' Chronicle.*) (p. xliv.)

Fruit and Vegetable Committee, March 9, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Banksian Medal.

To the Hon. Vicary Gibbs, Elstree, for bulbs of Onion 'Ailsa Craig.'
To P. Nelke, Esq., Virginia Water, for seven dishes of Apples.
To Messrs. Sutton, Reading, for Lettuces and Radishes.

Other Exhibits.

E. Lane, Esq., Kentchurch Court, Hereford: seedling Apple.

Sir Edmund Loder, Bart., Horsham: Apples 'St. Leonards Seedling,' 'Traveller,' 'Bassam,' 'Radford Beauty,' 'Grange's Pearmain.'

Sir Ernest Paget, Bart., Loughborough: Apples 'Umbrella' and 'Baddon Pippin.'

T. Sharpe, Esq., Westbury, Wilts; seedling Apple 'Burcomble.'

Messrs. R. Veitch, Exeter; Apples 'Claygate Pearmain,' 'Belle de Pontoise,' and 'Boston Russet.'

Messrs. J. Veitch, Chelsea: an Apple for naming.

Messrs. Wood, Wood Green, N.: 'Copped Hall' grape-storing bottle.

FRUIT AND VEGETABLE COMMITTEE, MARCH 23, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and thirteen members present.

Awards Recommended:—

Silver Knightian Medal.

To Mr. J. Poupart, Rainham, for Asparagus, &c.

Bronze Banksian Medal.

To Miss C. M. Dixon, Chichester, for Strawberries.

Cultural Commendation.

To Mr. A. Poupart, Twickenham, for Seakale.

Other Exhibits.

Messrs. G. Fowler Lee, Reading: fruit-bottling appliances.

Mr. J. Garland, Exeter: Apple 'Star of Devon,' Pear 'Uvedale's St. Germain' weighing 2½ lbs.

FRUIT AND VEGETABLE COMMITTEE, APRIL 6, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and twenty members present.

Awards Recommended:—

Silver-gilt Knightian Medal.

To Messrs. Rivers, Sawbridgeworth, for Oranges.

Silver Banksian Medal.

To Lord Monson, Lincoln, for twelve dishes of Apples.

To Messrs. Veitch, Chelsea, for Lettuces, Cucumbers, &c.

Award of Merit.

To Rhubarb 'Dawes' Challenge' (votes, unanimous), from Mr. T. E. Dawes, Kings Lynn. An enormous variety, very prolific, with sticks 3 feet 6 inches long and proportionately thick. Bright red, with pink flesh.

Cultural Commendation.

To Dr. Newington, Ticehurst, for Apples 'Annie Elizabeth,' 'Prince Albert,' and 'Bramley's Seedling.'

Fruit and Vegetable Committee, April 20, 1909.

Mr. A. H. Pearson, in the Chair, and nineteen members present.

Awards Recommended.

Silver Banksian Medal.

To the Countess Cowper, Pangshanger, for Potatos.
To Messrs. Sutton, Reading, for Cabbages.

Other Exhibits.

Mr. John Crook, Camberley: Apple 'Sturmer Pippin.'

South African Constantia Fruit Co., 157, Wandsworth Road, Nine Elms: Pineapples.

FLORAL COMMITTEE.

JANUARY 12, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Gold Medal.

To Messrs. Veitch, Chelsea, for stove and greenhouse plants.

Silver-gilt Flora Medal.

To Messrs. May, Upper Edmonton, for ferns.
To Mr. W. H. Page, Hampton, for Carnations and Lilies.

Silver Flora Medal.

To Mr. L. R. Russell, Richmond, for Bertolonias, &c.

Silver Banksian Medal.

To Mr. H. Burnett, Guernsey, for Carnations.
To Messrs. Cutbush, Highgate, for alpines, &c.
To Messrs. Low, Bush Hill Park, for Carnations, &c.

Award of Merit.

To *Begonia* 'Patrie' (votes, 13 for, 2 against), from Messrs. Lemoine, Nancy. In general appearance suggestive of *B.* 'Gloire de Lorraine,' with small flowers, almost wholly male, freely and continuously borne as in that variety, but duller in colour, old rose instead of bright pink, and more compact and neat both in general habit and in flower trusses. Derived from *B. socotrana* ♀ × *B. Pearcei* var. ♂. (Fig. 20.)

To Chrysanthemum 'Maud Allan' (votes, 19 for, 3 against), from Mr. N. Molyneux, Rookesbury Park Gardens, Wickham. A late-flowering pure white decorative Japanese variety, with narrow florets. Undisbudded sprays were exhibited to show its good habit and floriferousness.

Other Exhibits.

Messrs. Barr, Covent Garden : alpines.
Mr. F. H. Chapman, Rye : Freesias.
Misses Hopkins, Shepperton : alpines.
Mr. F. Lilley, Guernsey : Chrysanthemum 'New Year Yellow.'
Messrs. Peed, Streatham : alpines.
A. Sutton, Esq., Reading : *Cyclamen persicum*, collected corms.

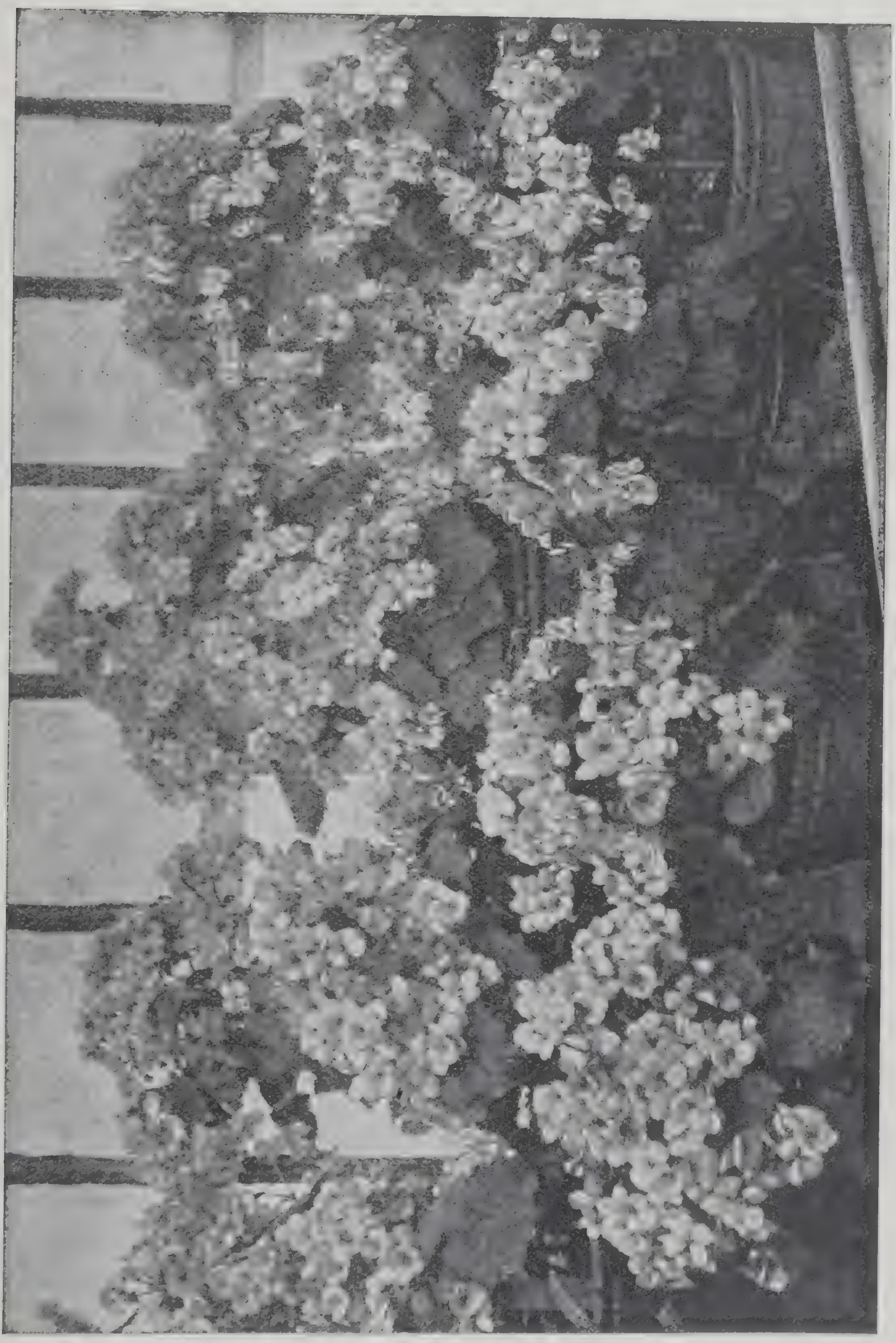


Fig. 20.—Begonia 'Patrie.' (*Lemoine.*) (p. xlviii.)

FLORAL COMMITTEE, JANUARY 26, 1909.

Mr. H. B. MAY in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. May, Upper Edmonton, for Davallias.

To Mr. W. H. Page, Hampton, for Carnations and Lilies.

To the Marquis of Salisbury, Hatfield House (gr. Mr. Prime), for *Euphorbia jacquiniaeflora.*

Silver Flora Medal.

To Mr. H. Burnett, Guernsey, for Carnations.

To Messrs. Cutbush, Highgate, for alpines, Carnations, &c.

To Messrs. Sutton, Reading, for Cyclamen.

To Messrs. J. Veitch, Chelsea, for greenhouse plants.

Silver Banksian Medal.

To Messrs. Low, Bush Hill Park, for Carnations, &c.

To Mr. H. Maude, Wisley School of Horticulture, for floral studies in colour photography, Lumière process.

To Messrs. Peed, Streatham, for alpines, &c.

To Mr. L. R. Russell, Richmond, for ornamental shrubs.

Award of Merit.

To Chrysanthemum 'Golden Sunset' (votes, unanimous), from Messrs. Robinson and Headey, Dunstable. A bright yellow decorative Japanese variety, with flowers of good substance on stout stalks, and with bright foliage. A sport from 'Victoria,' said to flower three weeks later.

Other Exhibits.

Messrs. Barr, Covent Garden : alpines, &c.
Mr. F. H. Chapman, Rye : Freesias.
Messrs. Cheal, Crawley : spring flowers.
Misses Hopkins, Shepperton : alpines.
Sir Trevor Lawrence, Bart., Burford : Anthuriums.
Mr. G. Reuthe, Keston : alpines, &c.
Mr. W. E. Wallace, Eaton Bray : Carnations.

FLORAL COMMITTEE, FEBRUARY 9, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended :—

Gold Medal.

To Mr. W. H. Page, Hampton, for Carnations and Lilies.

Silver-gilt Flora Medal.

To Messrs. Cuthbert, Southgate, for forced shrubs.

Silver-gilt Banksian Medal.

To Messrs. Cutbush, Highgate, for forced shrubs, Carnations, &c.
To Mr. Seward, Hanwell, for Cyclamen.
To Messrs. J. Veitch, Chelsea, for a group.

Silver Flora Medal.

To Mr. H. Burnett, Guernsey, for Carnations.
To Messrs. Cannell, Eynsford, for Chinese Primulas.
To Messrs. Sutton, Reading, for Chinese Primulas.

Silver Banksian Medal.

To Messrs. Clark, Dover, for alpines, &c.
To Messrs. Low, Bush Hill Park, for Carnations, &c.
To Messrs. May, Edmonton, for ferns, &c.
To Messrs. Mount, Canterbury, for Roses.
To Messrs. Peed, Streatham, for alpines.
To Mr. L. R. Russell, Richmond, for shrubs.
To Messrs. Ware, Feltham, for Primulas.

Bronze Flora Medal.

To Mr. Reuthe, Keston, for rare shrubs, &c.

Other Exhibits.

Messrs. Barr, Covent Garden : spring flowers.
Messrs. Bath, Wisbech : spring flowers.
Mr. F. H. Chapman, Rye : Freesias.
Messrs. Cheal, Crawley : alpines.
D. Crocket, Esq., Barcombe, Lewes : a painting.
Misses Hopkins, Shepperton : alpines, &c.
Sir Edmund Loder, Bart., Leonardslee : Sarracenias.
Mrs. McCreery, Windsor : seedling Carnation.
Miss Smith, Barnham, Bognor : Primroses, &c.
Mr. R. Sydenham, Birmingham : Lilies-of-the-Valley.
Messrs. Wallace, Colchester : Crocuses.

FLORAL COMMITTEE, FEBRUARY 23, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and thirty-one members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Cutbush, Highgate, for forced shrubs, Carnations, &c.

To Messrs. Cuthbert, Southgate, for forced shrubs.

To Miss Josephine Gundry, Foots Cray, for water-colour studies of flower.

To Mrs. Leschallas, Windlesham (gr. Mr. Farmer), for *Richardia Elliottiana.*

To Messrs. Veitch, Chelsea, for Cyclamen, Primulas, Rhododendrons, &c.

Silver Flora Medal.

To Mr. H. Burnett, Guernsey, for Carnations.
To Messrs. Low, Bush Hill Park, for Carnations, &c.
To Messrs. May, Edmonton, for ferns and flowers.
To Mr. W. H. Page, Hampton, for Carnations and Lilies.
To Mr. L. R. Russell, Richmond, for Lilacs, &c.

Silver Banksian Medal.

To Messrs. Cannell, Eynsford, for Primulas.
To Messrs. Mount, Canterbury, for Roses.
To Messrs. Peed, Streatham, for alpines.
To Messrs. Ware, Feltham, for alpines.

Bronze Banksian Medal.

To Mr. G. Reuthe, Keston, for hardy plants.

Award of Merit.

To *Freesia* 'Rose Queen' (votes, 20 for), from Messrs. Barr, Covent Garden. Flowers purplish-rose, the white tube marked with a few rose lines; lightly scented. The best in colour and scent of the red varieties yet exhibited.

Other Exhibits.

Messrs. Barr, Covent Garden: flowering bulbs.
Mr. H. Chapman, Rye: hybrid Cyclamen, &c.
Messrs. Clark, Dover: rock plants.
Miss Cox, Rose Hill, Dorking: flower studies.
Messrs. Eggett, Thames Ditton: ferns.
Misses Hopkins, Shepperton: rock plants.
F. W. Moore, Esq., Glasnevin, Dublin: *Lachenalia* 'Outlaw.'
Miss Smith, Barnham, Bognor: rock plants.
Mr. R. Sydenham, Birmingham: Lilies-of-the-Valley.
Mr. A. R. Upton, Guildford: hardy plants.

FLORAL COMMITTEE, MARCH 9, 1909.

Mr. W. A. BILNEY, J.P., in the Chair, and twenty-four members present.

Awards Recommended:—

Gold Medal.

To Sir Everard Hambro, Hayes, Kent, for rock plants.

Silver-gilt Banksian Medal.

To Messrs. Carter, High Holborn, for bulbs.
To Messrs. Wallace, Colchester, for alpine plants.

Silver Flora Medal.

To Messrs. Cannell, Swanley, for Begonias and Primulas.
To Messrs. Page, Hampton, for a group of Carnations, Lilies, &c.

To Messrs. Paul, Waltham Cross, for Camellias and ornamental Peaches.

To Mr. L. R. Russell, Richmond, for Azaleas.

Silver Banksian Medal.

To Messrs. Bees, Liverpool, for *Primula malacoides.*

To Mr. H. Burnett, Guernsey, for Carnations.

To Messrs. Cutbush, Highgate, for bulbous plants.

To Messrs. Low, Enfield, for Acacias, &c.

To Messrs. May, Upper Edmonton, for Cinerarias, Primulas, &c.

To Messrs. Peed, Streatham, for rock plants, Cacti, &c.

To the Marquis of Salisbury, Hatfield (gr. Mr. Prime), for a group of *Lachenalia Nelsoni.*

To Messrs. Veitch, Chelsea, for *Azalea indica.*

To Messrs. Ware, Feltham, for alpines.

Other Exhibits.

Messrs. Barr, King Street, Covent Garden: *Crocus* 'Bleu Celeste.'

J. T. Bennett-Poë, Esq., Cheshunt: *Camellia magnoliaeflora.*

Messrs. Cheal, Crawley: alpines.

Messrs. Clark, Dover: alpines.

Mrs. Denison, Berkhamsted: *Acacia cultriformis* and *Bryophyllum calycinum.*

Messrs. Eggett, Thames Ditton: hardy ferns.

Misses Hopkins, Shepperton: alpines.

W. P. Horton, Esq., Seaford: bulbous plants.

Messrs. Low, Enfield: Carnation 'Black Chief.'

H. A. Mangles, Esq., Seale: *Rhododendron longifolium* and *R. argenteum* (received **A.M.** previously under name of *R. grande*).

Messrs. Paul, Cheshunt: new Roses, &c.

Mr. Reuthe, Keston: alpines, shrubs, &c.

Miss A. Smith, Bognor: alpines.

Messrs. Ware, Feltham: *Primula obconica Warei.*

Floral Committee, March 23, 1909.

Mr. W. Marshall, V.M.H., in the Chair, and twenty members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Low, Enfield, for Carnations, Acacias, &c.

To Messrs. J. Veitch, Chelsea, for Rhododendrons, &c.

Silver-gilt Banksian Medal.

To Mr. H. Burnett, Guernsey, for Carnations.

To Mr. W. H. Page, Hampton, for Carnations and Lilies.

To Messrs. Paul, Cheshunt, for Lilacs.

To St. George's Nursery Co., Harlington, for Cyclamen

Silver Flora Medal.

To Messrs. Cutbush, Highgate, for Carnations, &c.
To Messrs. May, Upper Edmonton, for hardy ferns, &c.
To Mr. L. R. Russell, Richmond, for Azaleas, Bertolonias, &c.
To Messrs. Ware, Feltham, for alpines.

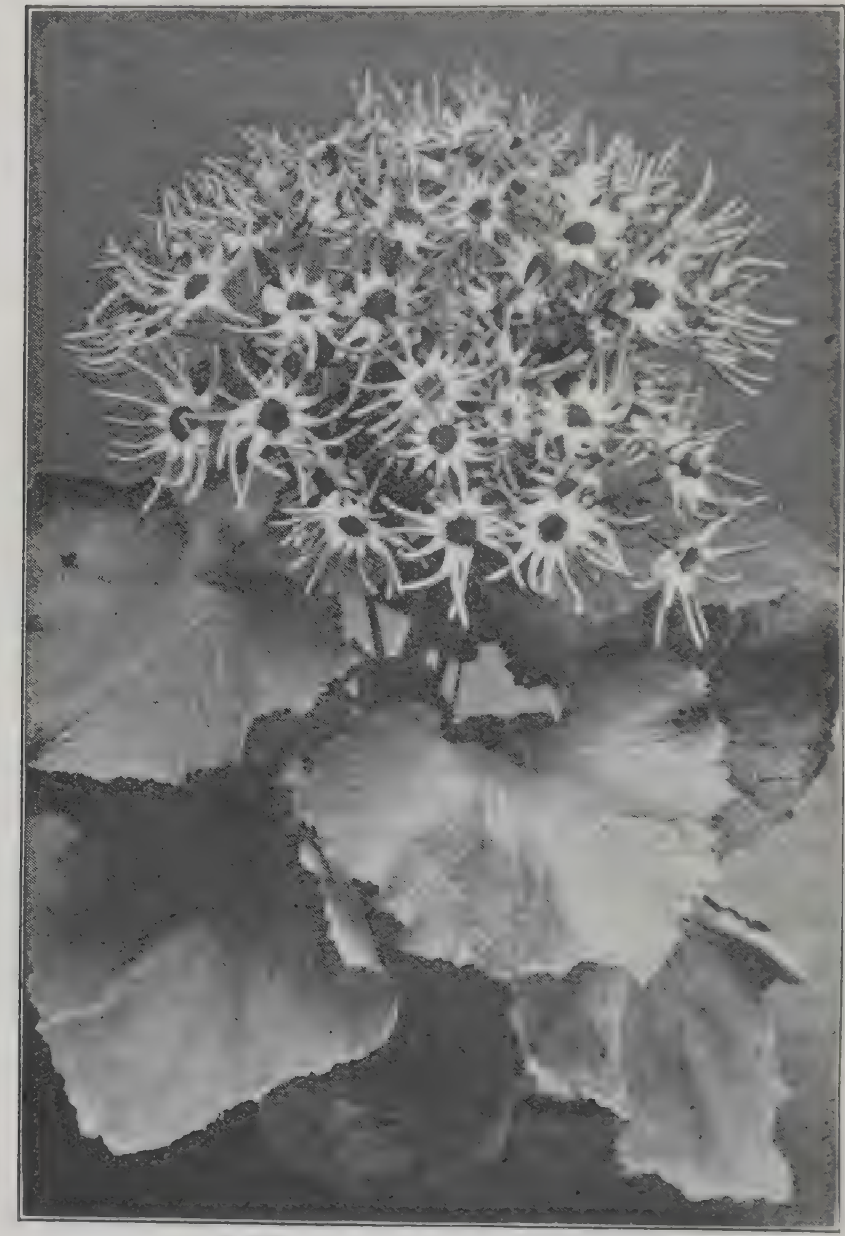


FIG. 21.—"CACTUS-FLOWERED" CINERARIA. (*Sutton.*) (p. lv.)

Silver Banksian Medal.

To Messrs. Cannell, Swanley, for *Begonia hydrocotylifolia* 'Saturne.'
To Messrs. Cheal, Crawley, for alpines.
To Messrs. Cuthbert, Southgate, for Azaleas.
To Mr. W. H. Lancashire, Guernsey, for Carnation 'Rose Doré.'

Bronze Flora Medal.

To Messrs. Peed, Streatham, for Carnations and alpines.
To Mr. G. Reuthe, Keston, for alpines.

Bronze Banksian Medal.

To Misses Hopkins, Shepperton, for alpines.

First-class Certificate.

To *Pteris aquilina congesta* (votes, unanimous), from Messrs. May, Edmonton. A very beautiful congested form of the common Bracken, growing about two feet high.

Award of Merit.

To *Begonia* 'Saturne' (votes, 12 for, 1 against), from Messrs. Cannell, Swanley. A light rose variety of the Mexican *B. hydrocotylifolia.* Leaves cordate, tinged on the underside with red. Flower-stalks 18 inches high, red, pilose. Flowers 1 inch across, dipetalous; capsule rose, tinged green.

To Carnation 'Rose Doré' (votes, 16 for), from Mr. W. H. Lancashire, Guernsey. A rosy-pink perpetual-flowering variety, with stiff stems and good calyx. Faintly clove-scented.

To Cineraria "Cactus-flowered" strain (votes, unanimous), from Messrs. Sutton, Reading. A very free-flowering strain, with colours ranging from white, through pink and lavender, to blue and purple. Plants very dwarf and compact. (Fig. 21.)

To *Crocus Sieberi* var. *versicolor* (votes, unanimous), from Mr. G. Reuthe, Keston. A beautiful variety collected by Moore in Greece. Flowers white, with the yellow tinge at the top of the perianth tube as in *C. Sieberi*; perianth tube and outer perianth pieces marked with purplish black.

To Rose 'Rhea Reid' (votes, 10 for, 1 against), from Mr. G. W. Piper, Uckfield. A purple-carmine Hybrid Tea; good form, but scentless. (Fig. 22.)

Other Exhibits.

Messrs. Bakers, Wolverhampton: alpines.
Messrs. Brooks, Basingstoke: *Primula sinensis* 'Queen Alexandra.'
Messrs. Bull, Chelsea: foliage plants and Amaryllis.
Messrs. Carter Page, London Wall, E.C.: Violas.
Messrs. F. Cant, Colchester: Rose 'Lady Roberts.'
The Earl of Clarendon, Watford: Violets.
Messrs. Clark, Dover: alpines.
Mr. Cornhill, Byfleet: Aubrietia 'Cloth of Gold.'
Guildford Hardy Plant Nursery: alpines, &c.
Messrs. Heath, Cheltenham: Pelargoniums, &c.
Messrs. Hill, Lower Edmonton: *Osmunda palustris* var.
Mr. Pingo-Horton, Seaford: alpines, &c.
Messrs. Jarman, Chard: Cinerarias.
H. P. Keatinge, Esq., Cairo: Freesia 'Egyptian Sunrise.'
Messrs. Laing, Forest Hill: Clivias, &c.
Messrs. Paul Cheshunt: Lachenalia 'His Reverence.'
Miss Smith, Bognor: alpines.
G. Whitaker, Esq., Palermo: Violet 'Tina Whitaker.'
Miss Willmott, Warley: *Elisena longipetala.*

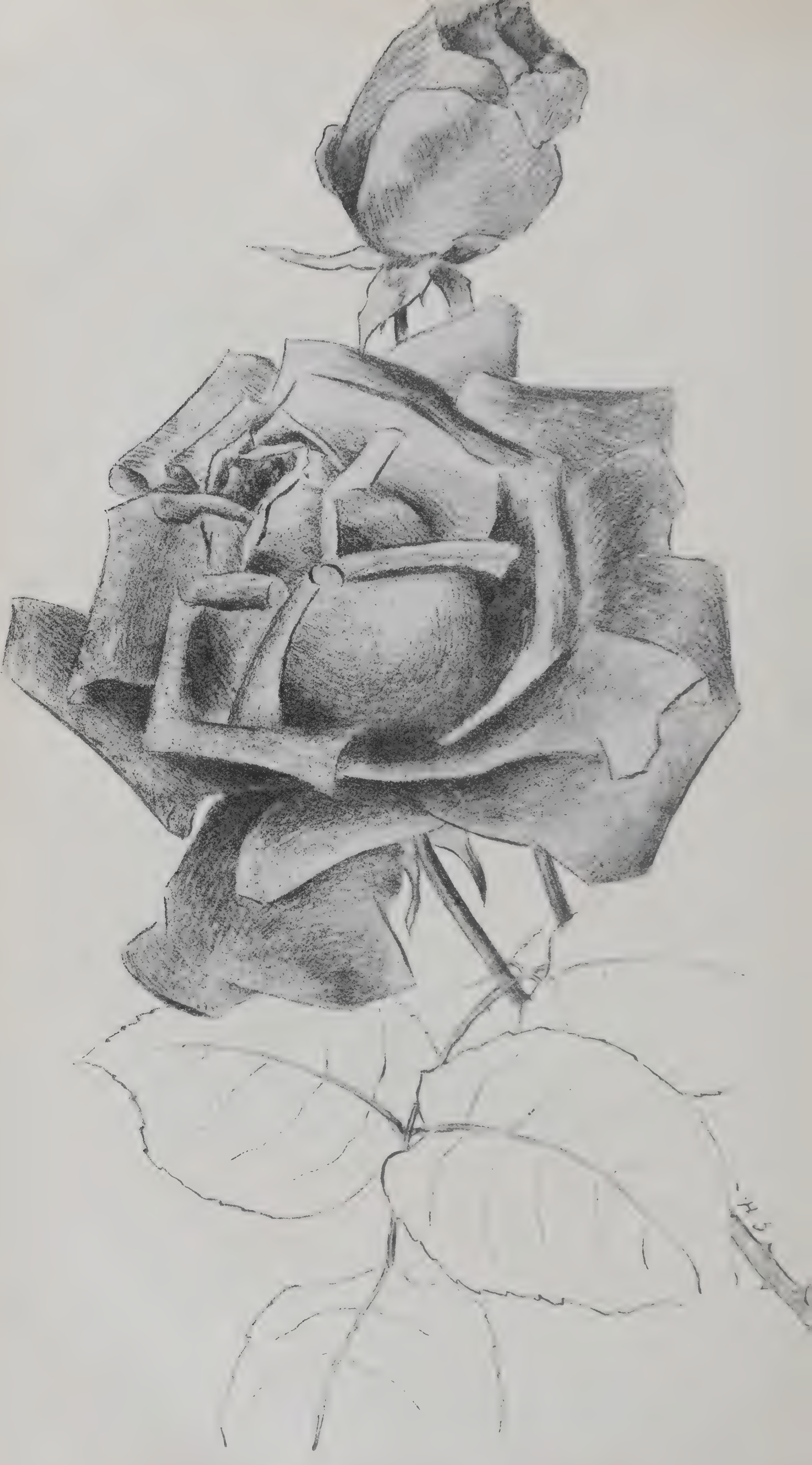


FIG. 22.—ROSE 'RHEA REID.' (*The Garden.*) (p. lv.)

FLORAL COMMITTEE, APRIL 6, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Cuthbert, Southgate, for forced shrubs.
To Messrs. Veitch, Chelsea, for shrubs, &c.

Silver-gilt Banksian Medal.

To Messrs. Cutbush, Highgate, for Carnations, &c.

Silver Flora Medal.

To Mr. Burnett, Guernsey, for Carnations.
To Messrs. Low, Enfield, for Acacias, Carnations, &c.
To Messrs. May, Edmonton, for ferns and flowering plants.
To Mr. Page, Hampton, for Roses, Lilies, and Carnations.
To Messrs. Paul, Waltham Cross, for flowering shrubs.
To Mr. Prince, Longworth, for Roses.
To Messrs. Wallace, Colchester, for alpines.

Silver Banksian Medal.

To Miss Alexander, Seal, for Roses, Violets, &c.
To Messrs. Cannell, Swanley, for Begonias.
To Messrs. F. Cant, Colchester, for Roses.
To Misses Hopkins, Shepperton, for alpines.
To Messrs. Jackman, Woking, for alpines.
To Major Lister, Hayward's Heath, for Amaryllis.
To Messrs. Peed, Streatham, for Caladiums.
To E. H. Johnstone, Esq., Groombridge, for Carnations.
To Mr. Reuthe, Keston, for alpines, &c.
To Mr. Russell, Richmond, for flowering shrubs.
To Messrs. Sutton, Reading, for Cinerarias.
To Messrs. Ware, Feltham, for alpines, &c.

Bronze Flora Medal.

To Messrs. Bakers, Codsall, for alpines.

Bronze Banksian Medal.

To Mrs. Bischoffsheim, Stanmore, for *Lachenalia tricolor.*

Award of Merit.

To *Hippeastrum* 'Magnificent' (votes, unanimous), from Messrs. R. Ker, Liverpool. Flowers of good form, on a stout stalk 18 inches high; ground colour white, almost entirely hidden by a beautiful brilliant scarlet. Leaves at flowering time small.

To *Hippeastrum* 'Marcus' (votes, unanimous), from Messrs. Veitch, Chelsea. A large flat flower of a bright scarlet colour; back of perianth pieces tinged with green at apex, and shaded crimson at base. Stalk 15 inches long, rigid. Leaves at flowering time very small.

To *Saxifraga apiculata alba* (votes, unanimous), from the Guildford Hardy Plant Nursery. A beautiful creamy white form of the well-known *S. apiculata*. The carpels and anthers are yellow. Flowers freely borne on short, leafy shoots.

Other Exhibits.

Messrs. Carter Page, London Wall, E.C.: Violas.
Messrs. Clark, Dover: alpines, &c.
R. Farrer, Esq., Clapham, Yorks: *Saxifraga Stribnryi.*
G. Fellows, Esq., Nottingham: Hybrid Scilla.
T. Firth, Esq., J.P., Heckmondwike, Yorks: variegated *Deutzia gracilis.*
Mr. R. E. Gill, Falmouth: Rhododendrons.
Glasnevin Botanic Gardens: Sarracenias.
Guildford Hardy Plant Nursery: alpines.
Sir Everard Hambro, Hayes: *Primula verticillata.*
Mr. Hardy, Seaton, Devon: *Viola odorata* 'Sir Wilfred Peek.'
Messrs. Ker, Liverpool: Amaryllis.
Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H.: *Viola odorata* 'Cyclops.'
Messrs. Low, Enfield: Acacias, Carnations, &c.
Miss Mangles, Seale: Rhododendrons.
W. J. Newman, Esq., Totteridge Park: Amaryllis.
Messrs. Paul, Cheshunt: climbing Roses, &c.
Mr. H. E. Pulham, Stanstead: alpines.
Messrs. Veitch, Chelsea: Amaryllis *Erlangea tomentosa*, and *Azalea indica* 'Jean Peters.'
Messrs. Whitelegg and Page, Chislehurst: Cyclamen.

FLORAL COMMITTEE, APRIL 20, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Carter, Holborn, for Schizanthus.
To Messrs. Cutbush, Highgate, for forced shrubs.
To Messrs. Low, Enfield, for Roses, Carnations, &c.
To Messrs. May, Edmonton, for ferns and flowering plants.
To Mr. G. Mount, Canterbury, for Roses.
To Mr. W. H. Page, Hampton, for Carnations, Lilies and Roses.
To Messrs. W. Paul, Waltham Cross, for Roses in pots.
To Mr. G. Prince, Longworth, for Roses.
To Messrs. Veitch, Chelsea, for Cinerarias, &c.

Silver Banksian Medal.

To Messrs. Wallace, Colchester, for alpines, &c.
To Sir G. Loder, Bart., Leonardslee, for Rhododendrons, &c.

Bronze Flora Medal.

To Messrs. Cannell, Swanley, for Zonal Pelargoniums.
To Messrs. Sutton, Reading, for Italian Hyacinths and Freesias.

Bronze Banksian Medal.

To Messrs. Dobbie, Rothesay, for Pansies, &c.
To the Guildford Hardy Plant Nursery, for alpines.
To Messrs. Ware, Feltham, for alpines.

First-class Certificate.

To *Bougainvillea* 'Rosa Catelina' (votes, unanimous), from Colonel Petre, Westwick House, Norwich. A very free-flowering variety, with large bracts of a bright rosy-scarlet. Flowers borne on arching stems. Introduced from Las Palmas, Grand Canary.

To *Primula Forrestii* (votes, unanimous), from Messrs. Bees, Liverpool. A new species collected by Mr. Forrest on the limestone cliffs of Yunnan, at an altitude of 9000 feet. Umbels of dark yellow drooping flowers, half-inch across, with a faint zone of orange round the eye. Leaves elliptic, cordate, crenate; petioles long. The whole plant glandular hairy. Said to be quite hardy at Liverpool. (Fig. 23.)

Award of Merit.

To Auricula 'Admiration' (votes, unanimous), from Mr. J. Douglas, V.M.H., Great Bookham. Good circular white-centred alpine. Violet, shading off to the light-blue edge. Well-formed truss.

To Auricula 'Claud Halcro' (votes, unanimous). Another alpine variety from Mr. Douglas. Beautiful golden centre. Rich maroon, shading off to light red. Enormous truss, with large, well-formed pips.

To Auricula 'Robert Bruce' (votes, 18 for, 4 against), from the same raiser. Large, beautifully proportioned flower. Centre white; ground colour dark purple fading to heliotrope, a somewhat unusual colour among alpine auriculas. Good truss.

To Auricula 'Ulleswater' (votes, 22 for, 1 against), from Mr. Douglas. Large white-centred alpine. Flowers of very good form. Ground colour purple, gradually shading to heliotrope.

To Malmaison Carnation 'Lady Coventry' (votes, 16 for, 1 against), from Messrs. Cutbush, Highgate. Flower about 4½ inches across, cerise, strongly clove-scented. The calyx is weak, and the flower too large for the stems, which require the support of wires.

To *Hippeastrum* 'Pinkie' (votes, unanimous), from Lieut.-Colonel Holford, C.V.O., C.I.E., Westonbirt. Flowers rather small, but of excellent form; white, veined and shaded rosy-scarlet; throat tinged with green; 2 feet high, robust.

To *Hippeastrum* 'Gracchus' (votes, unanimous), from Messrs. Veitch, Chelsea. Large, well-formed flower, bright scarlet, shading to crimson in the throat; perianth-segments broad, of good substance; vigorous.

To *Saxifraga decipiens hybrida grandiflora* (votes, unanimous), from Mr. T. Kitley, Bath. A beautiful crimson variety of *Saxifraga decipiens.*

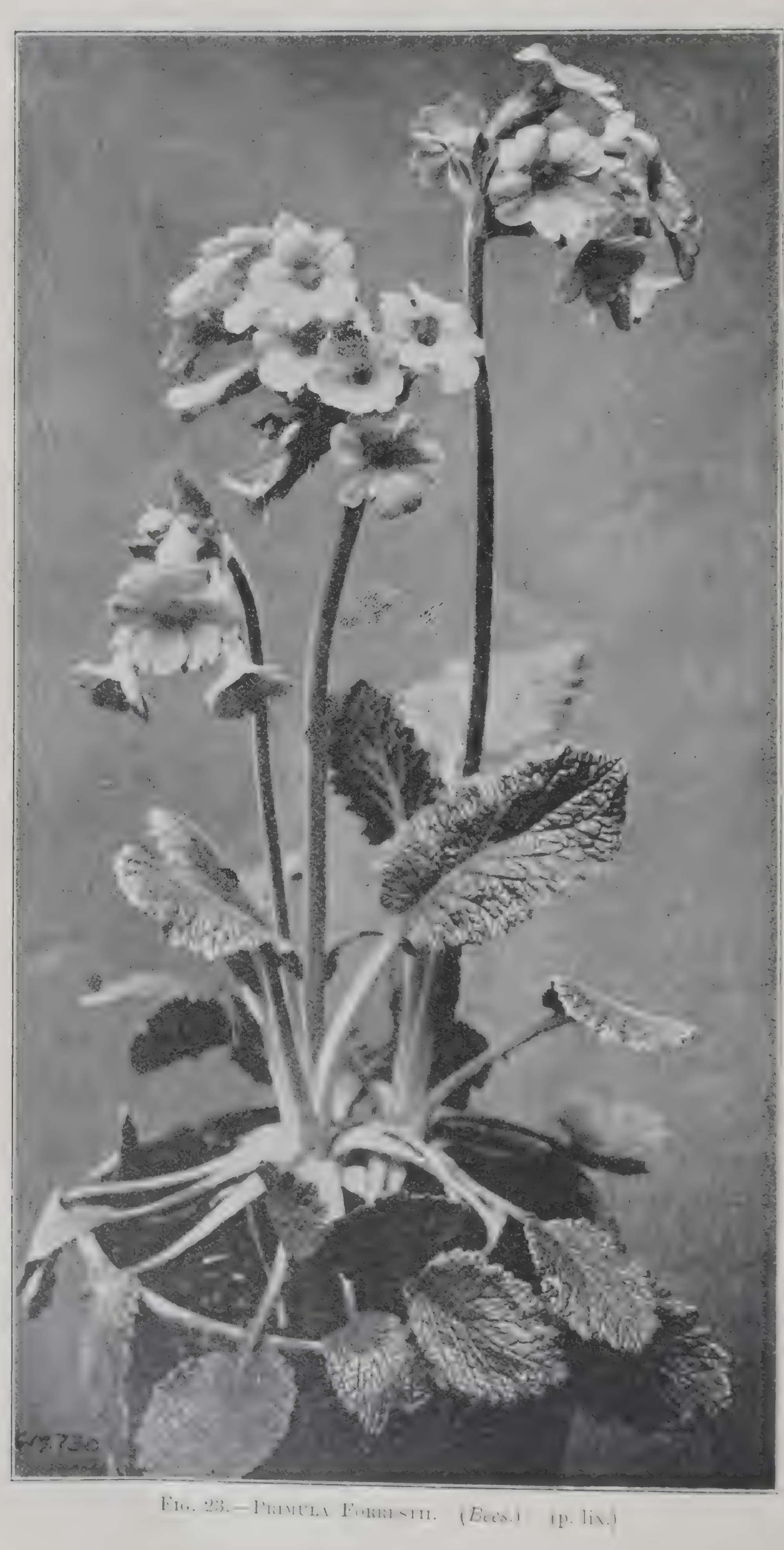


Fig. 23.—Primula Forrestii. (*Bees.*) (p. lix.)

Other Exhibits.

J. S. Arkwright, Esq., M.P., Lulworth: *Primula* 'Evelyn Arkwright.'

Messrs. Bakers, Codsall: alpines.
Messrs. Barr, Covent Garden: *Saxifraga* 'Ditton Crimson.'
Messrs. Bunyard, Maidstone: alpines.
Messrs. F. Cant, Colchester: climbing Roses.
Messrs. B. Cant, Colchester: Roses.
Messrs. Carter Page, London Wall: Violas.
Messrs. Cheal, Crawley: Roses.
Messrs. Clark, Dover: alpines, &c.
Countess Cowper, Panshanger: Roses and Violets.
Messrs. Gunn, Olton: *Ranunculus montanus.*
Misses Hopkins, Shepperton: alpines.
Lieut.-Colonel Holford, C.V.O., C.I.E., Westonbirt: Amaryllis.
Messrs. Jackman, Woking: alpines.
H. Little, Esq., Twickenham: Clivias.
Messrs. Low, Enfield: Roses and Azaleas.
Messrs. Paul, Cheshunt: Roses.
Messrs. Peed, Streatham: alpines, &c.
Mr. H. E. Pulham, Stanstead: alpines.
Mr. G. Reuthe, Keston: alpines, &c.
Miss Smith, Bognor: alpines.
Miss Willmott, V.M.H., Warley: *Arctotis aureola robusta.*

ORCHID COMMITTEE.

JANUARY 12, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-two members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Charlesworth, Hayward's Heath, for a group.

Silver Flora Medal.

To Sir Jeremiah Colman, Bart., V.M.H., Gatton Park, Reigate, for a group of hybrids raised at Gatton Park, and for singular species of Orchids.

Silver Banksian Medal.

To Messrs. Hugh Low, for a group.

First-class Certificate.

To *Cattleya Percivaliana*, Charlesworth's variety (votes, unanimous), from Messrs. Charlesworth. Flowers pure white with ruby-crimson blotch and yellow disc to the lip.

Award of Merit.

To *Cattleya* × 'Maggie Raphael,' Westonbirt variety (*C. Dowiana aurea* × *C. Trianaei* 'Imperator') (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E. C.V.O., Westonbirt (gr. Mr. H. G. Alexander). Sepals and petals rose colour with a white veining. Lip glowing mauve-crimson, the base veined with bright yellow.

To *Vanda Watsonii* (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. Allied to *V. Kimballiana*. Flowers white. The plant bore four spikes.

To *Odontoglossum* × *ardentissimum* 'Norman Cookson' (*O. Pescatorei* × *O. crispum*) (votes, 12 for, 4 against), from Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. H. J. Chapman). Flowers white, heavily blotched with purple.

Cultural Commendation.

To Mr. H. Ballantine, gr. to Sir H. Schröder, The Dell, Egham, for *Masdevallia ignea* with over seventy flowers.

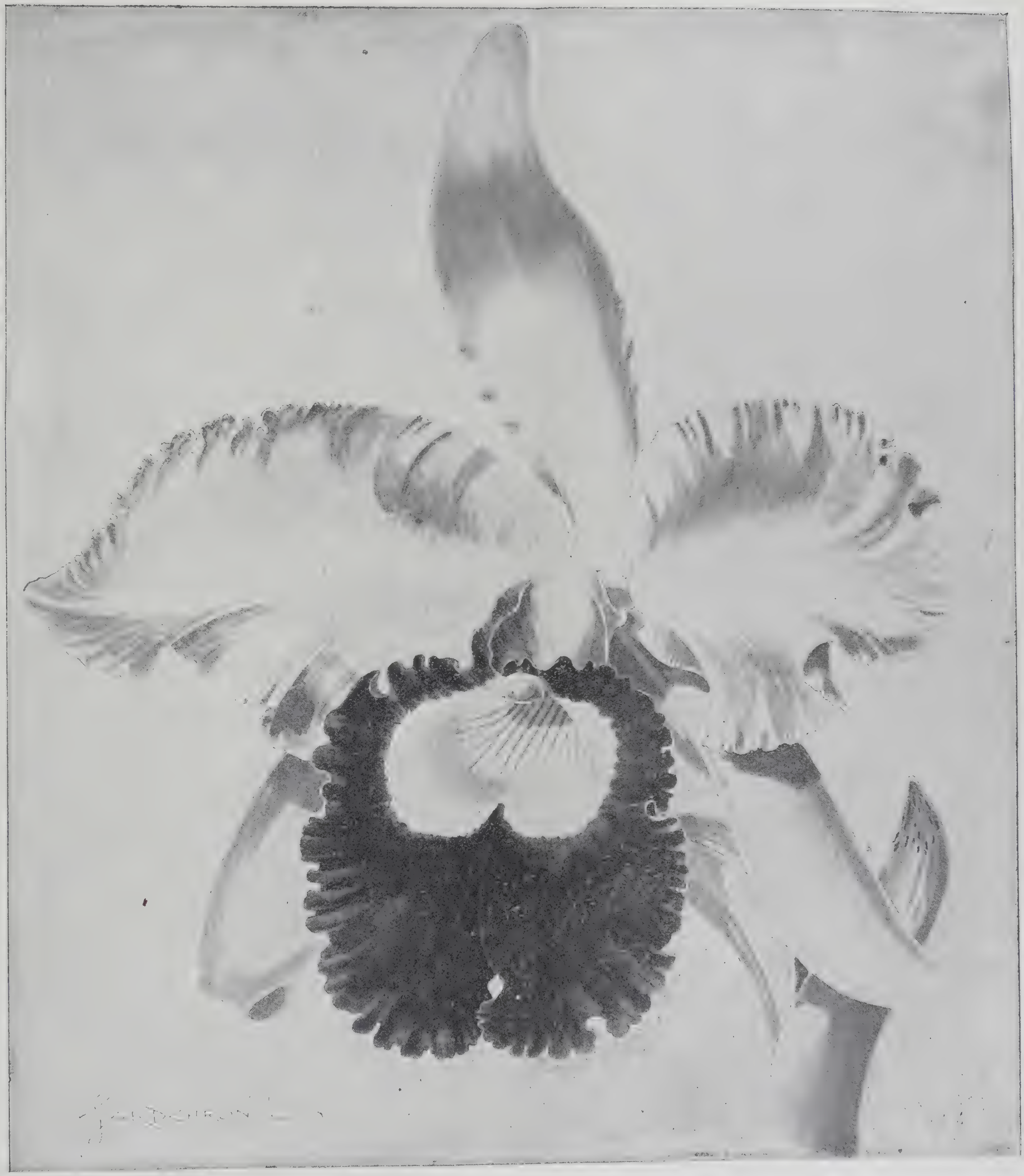
Other Exhibits.

Sir Trevor Lawrence, Bart., K.C.V.O.: *Odontoglossum* hybrid.

Francis Wellesley, Esq.: *Sophrocattleya* × 'Mrs. Francis Wellesley' (*S. grandiflora* × *C. labiata*).

Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: hybrids.

Messrs. Veitch: hybrid Cypripediums.



[Fig. 24.—Laeliocattleya × 'Felicia.' (*Gardeners' Chronicle.*)

(p. lxiii.)

(*To face page* lxii.)

Messrs. McBean: Odontoglossums.
Norman C. Cookson, Esq.: Cypripediums.
H. J. Bromilow, Esq.: *Cypripedium Charlesworthii Bromilowiae.*
H. T. Pitt, Esq.: *Maxillaria Hubschii* and Cypripediums.
Messrs. Armstrong & Brown: Cypripediums.
Henry Little, Esq.: *Cypripedium insigne*, Little's variety.
Monsieur Mertens: Odontoglossums.
R. G. Thwaites, Esq.: *Cattleya* × 'Leda,' Thwaites variety (*Dowiana aurea* × *Percivaliana*).

ORCHID COMMITTEE, JANUARY 26, 1909.

Mr. J. GURNEY FOWLER in the Chair, and eighteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Charlesworth, Hayward's Heath, for a group of hybrid Orchids.

Silver Banksian Medal.

To Messrs. Hugh Low, for a group.
To Messrs. Cypher, for Cypripediums.
To Mr. A. W. Jensen, for *Odontoglossum crispum.*

First-class Certificate.

To *Sophrolaeliocattleya* × 'Marathon' var. 'Vesuvius' (*S.-l.* × 'Psyche' × *C.* × 'Empress Frederick') (votes, unanimous), from Messrs. Charlesworth. Flowers ruby-red with a yellow tint.

To *Laeliocattleya* × 'Felicia' (*L.-c.* × *Haroldiana* × *C. Trianaei*) (votes, unanimous), from Messrs. Charlesworth. A large pale-rose flower with purplish claret front to the lip. (Fig. 24.)

To *Cypripedium* × 'Earl of Tankerville' (*Exul* × *nitens*, Sanders variety) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). A portion of the plant which received an **A.M.** January 9, 1906. Dorsal sepal white with pale green base, heavily blotched with purple. Petals and lip yellow marked with red-brown. (Fig. 25.)

Award of Merit.

To *Cypripedium* × 'Hera Euryades,' New-Hall-Hey variety (*Leeanum superbum* × *Boxallii*) (votes, 13 for, 3 against), from J. Forster Alcock, Esq., Northchurch. Dorsal sepal white tinged with purple and spotted with chocolate-purple. Petals and lip yellow tinged with red-brown.

To *Cypripedium* × 'Our Queen' (*Leeanum* × *Stevensii*) (votes, unanimous), from W. Thompson, Esq., Walton Grange, Stone (gr. Mr. Stevens). Resembling *C. Leeanum* in its markings, but with the white dorsal sepal more densely spotted with deep rose.

Other Exhibits.

Sir Jeremiah Colman, Bart.: a group.
Mr. F. McBean: Cattleyas and Odontoglossums.

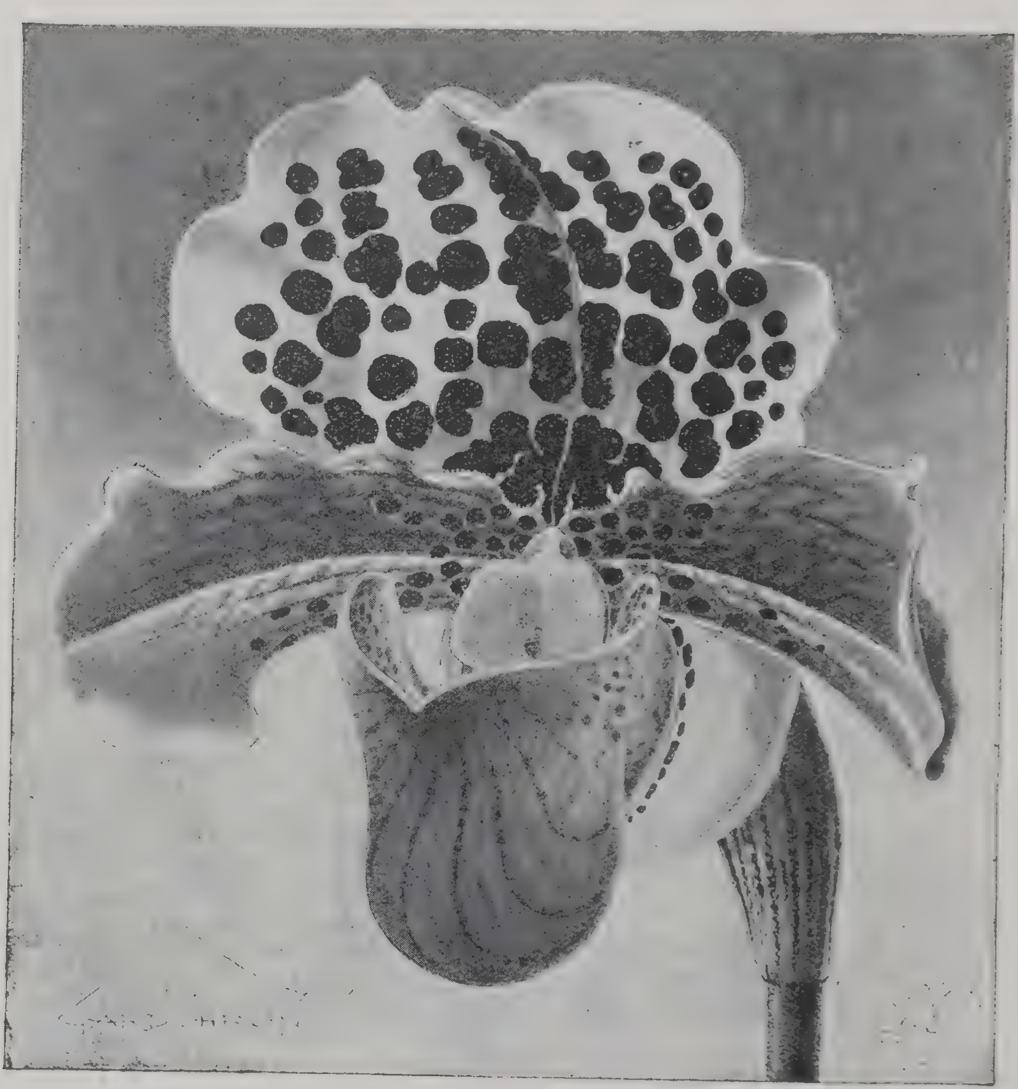


FIG. 25.—CYPRIPEDIUM × 'EARL OF TANKERVILLE.' (*Gardeners' Chronicle.*) (p. lxiii.)

Francis Wellesley, Esq.: *Cattleya Trianaei* 'The Premier.'
Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: four new hybrids.
Mr. F. Hanson, Somerleyton: spikes of *Calanthe.*

ORCHID COMMITTEE, FEBRUARY 9, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-six members present.

Awards Recommended:—

Gold Medal.

To Messrs. Charlesworth, Hayward's Heath, for a large group, including many plants of *Phalaenopsis Schilleriana.*

Lindley Medal.

To Mr. H. G. Alexander, Orchid grower to Lieut.-Col. G. L. Holford, C.I.E., C.V.O., for a specimen of *Odontoglossum* × *crispo-Harryanum* with four spikes, bearing together 125 flowers.

Silver-gilt Flora Medal.

To Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. H. J. Chapman), for rare Odontoglossums.

Silver Flora Medal.

To Messrs. McBean, Cooksbridge, for a group of white *Laelia anceps*.
To Messrs. Cypher, Cheltenham, for Cypripediums and Calanthes.
To Messrs. Hugh Low, for a group.

Silver Banksian Medal.

To Messrs. Veitch, for Odontoglossums and Cypripediums.
To Messrs. Moore, Rawdon, Leeds, for a group of Cypripediums.

First-class Certificate.

To *Odontoglossum* × *ardentissimum* 'Phœbe' (*Pescatorei* × *crispum*) (votes, unanimous), from Norman C. Cookson, Esq. (gr. Mr. Chapman).

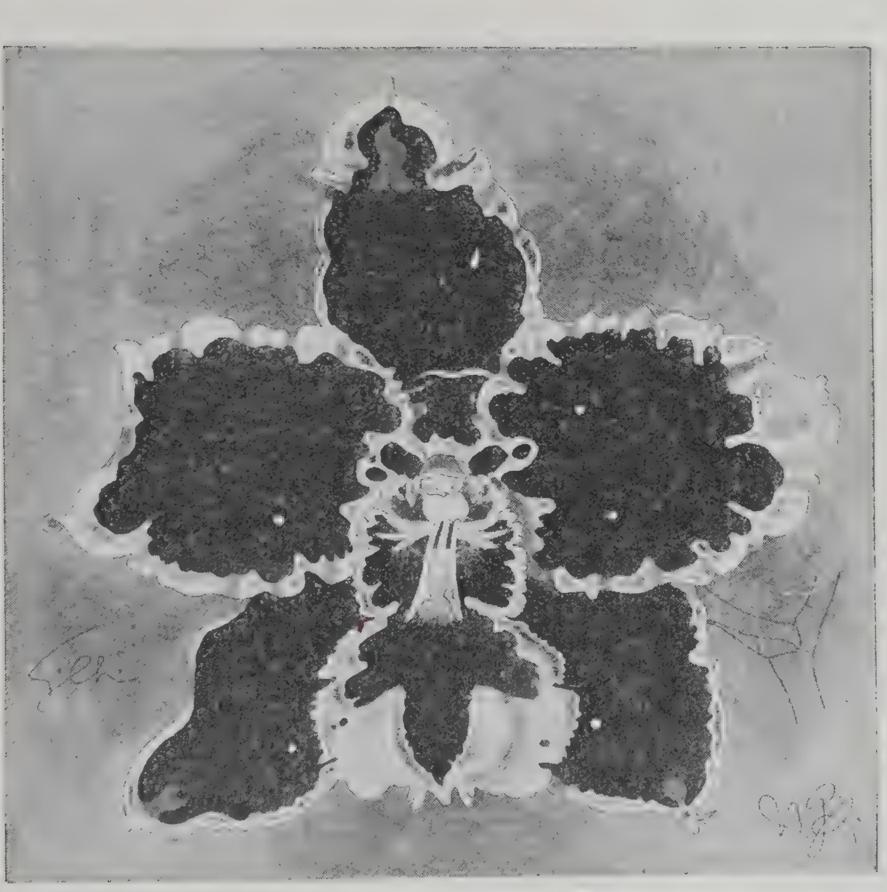


FIG. 26.—ODONTOGLOSSUM × ARDENTISSIMUM 'PHŒBE.' (*Gardeners' Chronicle.*

Flowers deep reddish-claret colour on the inner parts of the segments, the tips and margins being pure white. (Fig. 26.)

Award of Merit.

To *Laeliocattleya* × 'Goldfinch' *superba* (*L.-c. warnhamiensis* × *C. Dowiana aurea*) (votes, 20 for, 1 against), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. Alexander). A profuse-flowering hybrid with bright yellow flowers with crimson-purple lips bearing orange lines at the base.

To *Cypripedium* × 'Leander,' Exhims variety (*villosum* × *Leeanum*) (votes, 14 for, 7 against), from J. Forster Alcock, Esq., Exhims, Northchurch. Dorsal sepal white spotted with purple. Lip and petals greenish-yellow tinged with purple.

Other Exhibits.

His Grace the Duke of Marlborough: *Cattleya Trianaei*, Blenheim variety.

Sir Trevor Lawrence, Bart., K.C.V.O.: *Epidendrum erubescens.*
Sir Jeremiah Colman, Bart.: rare Orchids.
Sir W. Marriott: two Sophrocattleyas.
Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: hybrids.
R. G. Thwaites, Esq.: *Odontioda Bradshawiae.*
W. Bolton, Esq.: *Cypripedium* × 'Iris' *magnificum.*
Mr. F. McBean: Odontoglossums and Cattleyas.
Monsieur Mertens: hybrid Odontoglossums.
Messrs. Armstrong & Brown: *Cypripedium* × 'Hera.'
Messrs. Duchesne, Belgium: *Cattleya Schroderae* 'The Giant.'

ORCHID COMMITTEE, FEBRUARY 23, 1909.

Mr. HARRY J. VEITCH in the Chair, and twenty-six members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Sander, St. Albans, for a group in which the hybrid Odontoglossums and *Phalaenopsis Schilleriana* were remarkable.

Silver Flora Medal.

To Messrs. Charlesworth, Hayward's Heath, for hybrids.

Silver Banksian Medal.

To Messrs. Cypher, Cheltenham, for a group.
To Monsieur Mertens, Ghent, for hybrid Odontoglossums.

First-class Certificate.

To *Laeliocattleya* × 'Pizarro,' Westonbirt variety (*L. Jongheana* × *C. Dowiana aurea*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). Flowers as large as those of *C. Dowiana*, rose coloured, with gold veining on the lip. (Fig. 27.)

To *Cattleya Trianaei Mooreana* (votes, 13 for, 5 against), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. Flowers of good shape. Sepals and petals silver-white tinged with rose, the petals having a claret-purple band. Lip deep claret-purple with yellow disc.

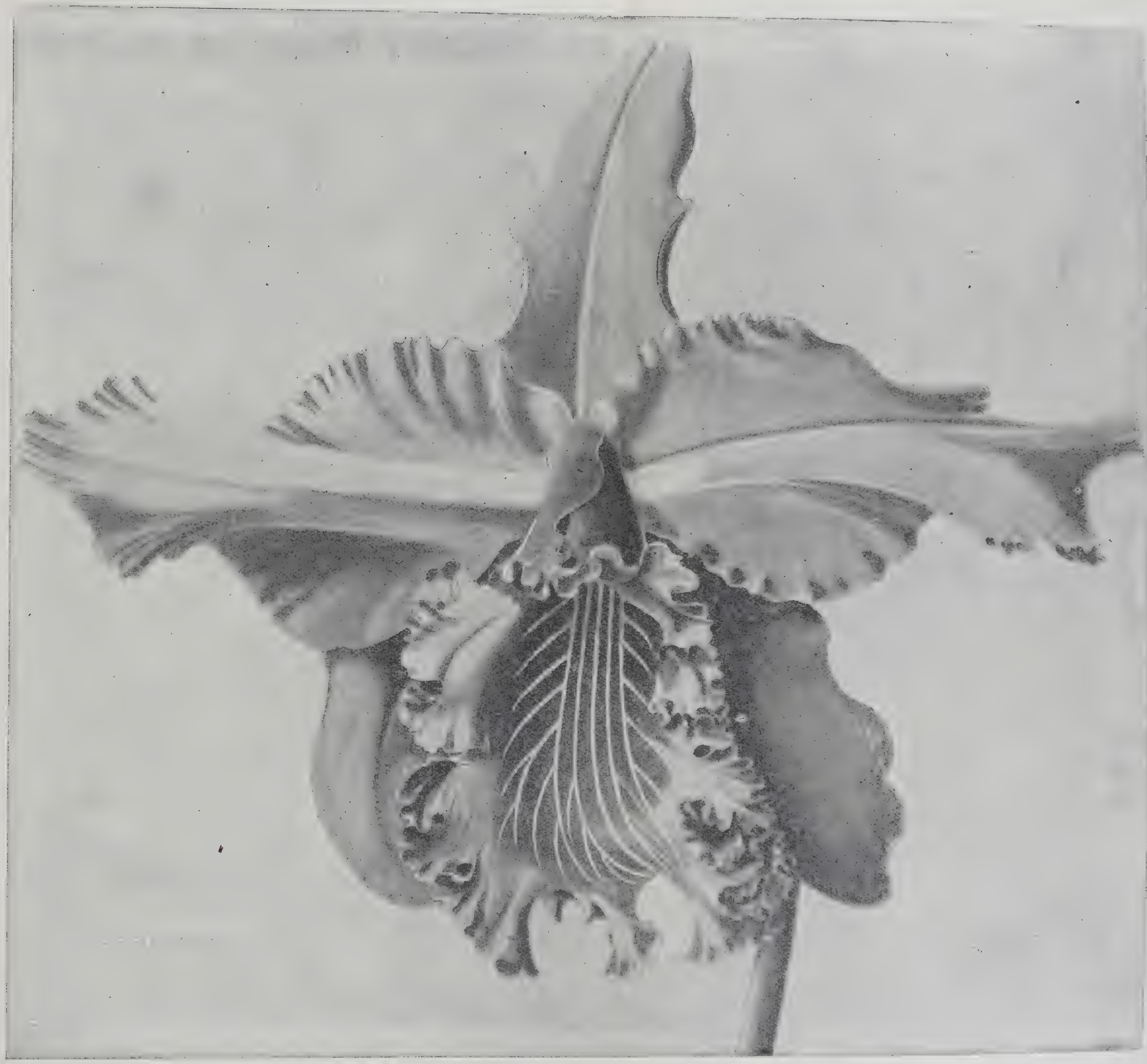


FIG. 27.—LAELIOCATTLEYA × 'PIZARRO,' WESTONBIRT VARIETY.' *Gardeners' Chronicle.)*

(*To face page* lxvi.)

To *Odontioda* × 'Lutetia' (*O. luteo-purpureum* × *C. Noezliana*) (votes, unanimous), from Messrs. Charlesworth. Flowers resembling those of *O. luteo-purpureum*, yellowish, mottled and tinged with cinnabar-scarlet. (Fig. 28.)

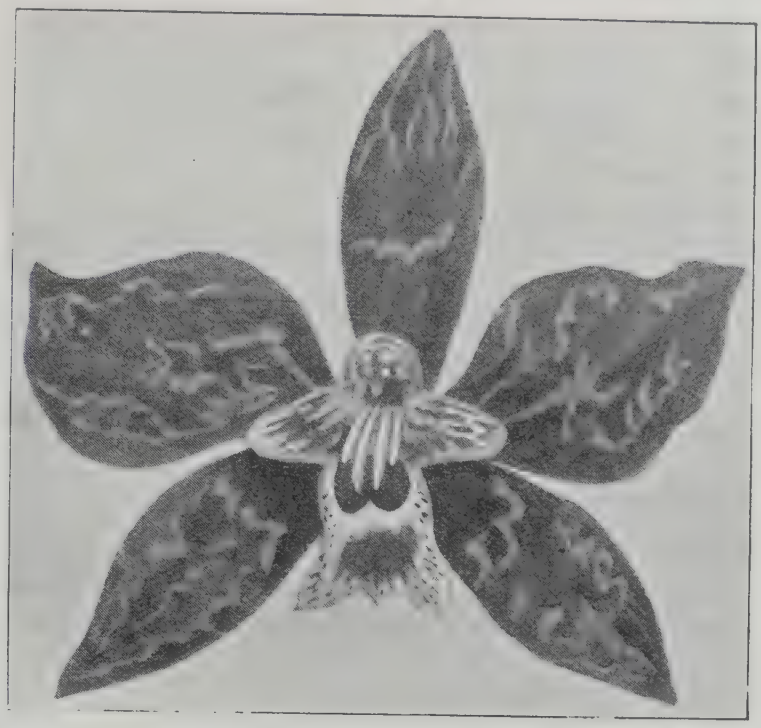


FIG. 28.—ODONTIODA × 'LUTETIA.' (*Journal of Horticulture.*)

Award of Merit.

To *Dendrobium* × 'Lady Colman' ('Artemis' × *Findlayanum*) (votes, unanimous), from Sir Jeremiah Colman, Bart., Gatton Park (gr. Mr. Collier). A large and beautiful hybrid, white, with the outer halves of the sepals and petals tinged with rose. The labellum has a maroon disc, in front of which is a white band, the apex being rose colour.

To *Cycnoches peruvianum*, Tracy's variety (votes, 9 for, 4 against), from Mr. H. A. Tracy, Twickenham. Flowers greenish, sparsely spotted with purple and densely set on the inflorescence.

To *Odontioda* × *keighleyensis* (*O. cirrhosum* × *C. Noezliana*) (votes, unanimous), from Messrs. Charlesworth. Inflorescence branched; flowers formed nearly like *O. cirrhosum*; blood-red.

To *Cymbidium* × *Woodhamsianum*, Orchidhurst variety (*Lowianum* × *eburneo-Lowianum* (votes, unanimous), from Messrs. Armstrong & Brown. Flowers large, greenish-white with red markings on the lip.

Botanical Certificate.

To *Odontoglossum cariniferum*, from de B. Crawshay, Esq. (gr. Mr. Stables). Inflorescence 3 feet, branched. Flowers brownish with white lip.

Certificate of Appreciation.

To *Dendrobium* × *atro-Brymerianum* (*atroviolaceum* × *Brymerianum*), from R. G. Thwaites, Esq., Streatham (gr. Mr. Black). A very interesting hybrid, in which the predominance of *D. atroviolaceum* and the suppression of the fringing on the lip of *D. Brymerianum* is very remarkable. Flowers formed like *D. atroviolaceum*, whitish-green with minute purple spots, the lip being veined with dark purple.

Other Exhibits.

Lieut.-Col. Holford: hybrids.
Sir Jeremiah Colman, Bart.: rare species.
de B. Crawshay, Esq.: Odontoglossums.
W. Waters Butler, Esq.: a group.
Messrs. McBean: a group.
J. Gurney Fowler, Esq.: *Odontoglossum* × *Smithii.*

ORCHID COMMITTEE, MARCH 9, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-nine members present.

Awards Recommended :—

Gold Medal.

To Sir Jeremiah Colman, Bart., V.M.H., Gatton Park, Reigate (gr. Mr. Collier), for a group of hybrid Dendrobiums and other Orchids.

Silver-gilt Flora Medal.

To Messrs. Charlesworth, Hayward's Heath, for a group.

Silver Flora Medal.

To Messrs. Sander, St. Albans, for a group of hybrid Odontoglossums.

To Messrs. Hugh Low, for a group.

Silver Banksian Medal.

To Messrs. Cypher, Cheltenham, for hybrid Cypripediums and Cattleyas.

To Monsieur Mertens, Ghent, for hybrid Odontoglossums.

First-class Certificate.

To *Cattleya Schroderae* 'Mrs. F. Sander' (votes, unanimous), from Messrs. Sander. A fine, pure white flower with chrome-yellow disc to the lip.

To *Odontioda* × *Bradshawiae*, Cookson's variety (*O. crispum* × *C. Noezliana*) (votes, unanimous), from Norman C. Cookson, Esq., Oakwood, Wylam (gr. Mr. Chapman). Flowers equal to *O. crispum*; cinnabar-scarlet with white tip and margins to the segments, tinged with rose. (Fig. 29.)

To *Sophrocattleya* × *Thwaitesii* (*S. grandiflora* × *C. Mendelii*) (votes, 16 for, 2 against). Flowers carmine-rose with a yellow base to the lip.

To *Cattleya Trianaei* 'Grand Monarch' (votes, unanimous), from F. Menteith Ogivlie, Esq., The Shrubbery, Oxford (gr. Mr. Balmforth). A very large and handsome variety with rosy-lilac flowers, having the front of the lip purplish-crimson.

Award of Merit.

To *Odontoglossum* × *Wyonianum* (parentage unrecorded) (votes, unanimous), from J. Gurney Fowler, Esq. (gr. Mr. J. Davis). A pretty white flower with confluent spotting of reddish-purple in the inner parts of the segments.

Botanical Certificate.

To *Chytroglossa Marilconiae*, from Messrs. Sander. A dwarf species with pendent racemes of small flowers.

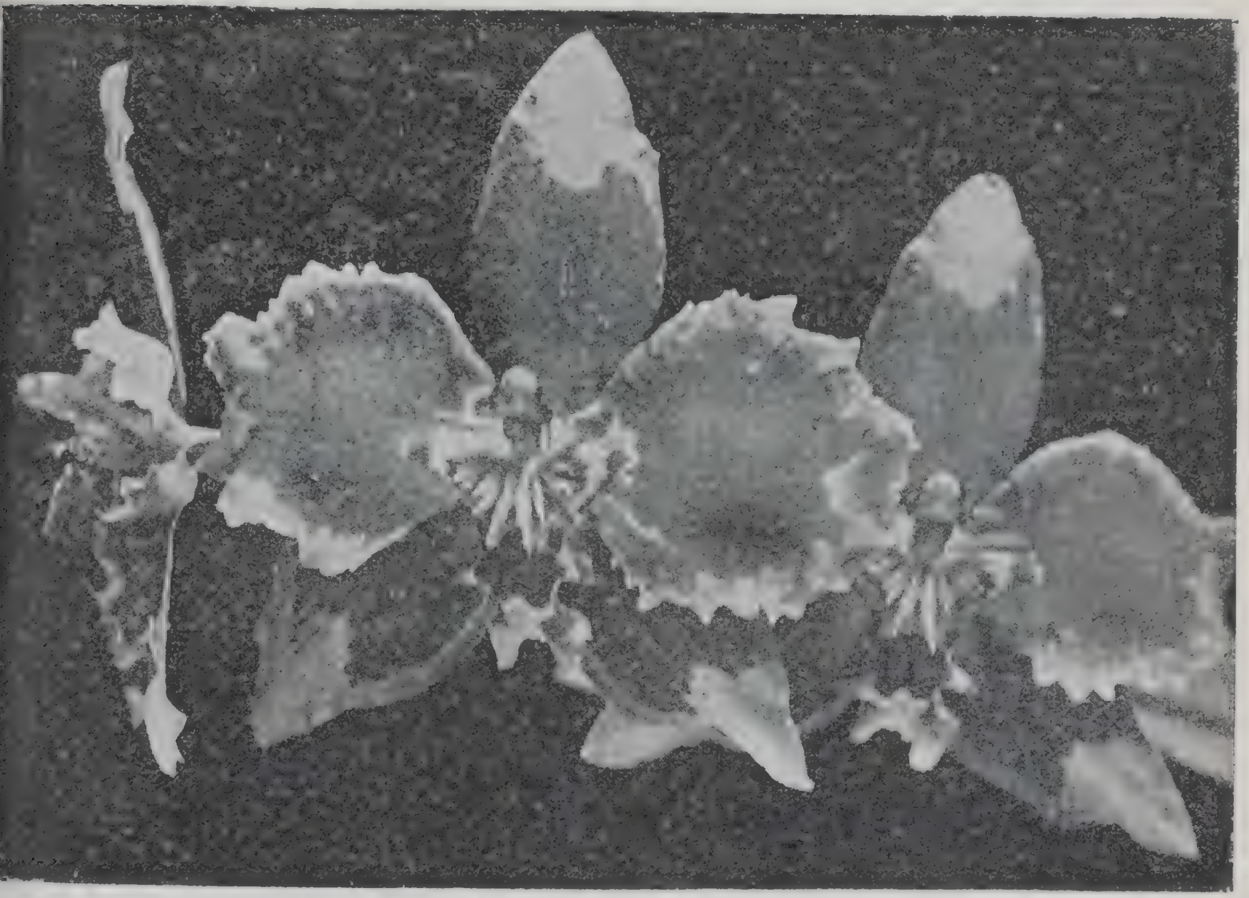


Fig. 34.—Odontoglossum × 'Theodora.' (*Gardeners' Chronicle.*) (p. lxviii.)

Cultural Commendation.

To Mr. H. Ballantine, gr. to Baron Sir H. Schröder, for a fine specimen of *Cymbidium insigne* with three spikes, 5 feet in height.

To Mr. Salter, gr. to Walter Cobb, Esq., for *Coelogyne cristata alba* with about fifty spikes.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: hybrid orchids.
H. S. Goodson, Esq.: *Odontioda* × *Goodsoniae.*
Norman C. Cookson, Esq.: Odontiodas and Odontoglossums.
Messrs. Jas. Veitch: a group.
H. A. Innes, Esq.: Cattleyas.
Mr. W. P. Horton: a group.

ORCHID COMMITTEE, MARCH 23, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-two members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. McBean, Cooksbridge, for a group of Odontoglossums.

Silver Flora Medal.

To Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt, Tetbury, for hybrids.

To H. S. Goodson, Esq., Putney, for a group.

To Messrs. Charlesworth, for hybrids.

To Messrs. Cypher, for a group.

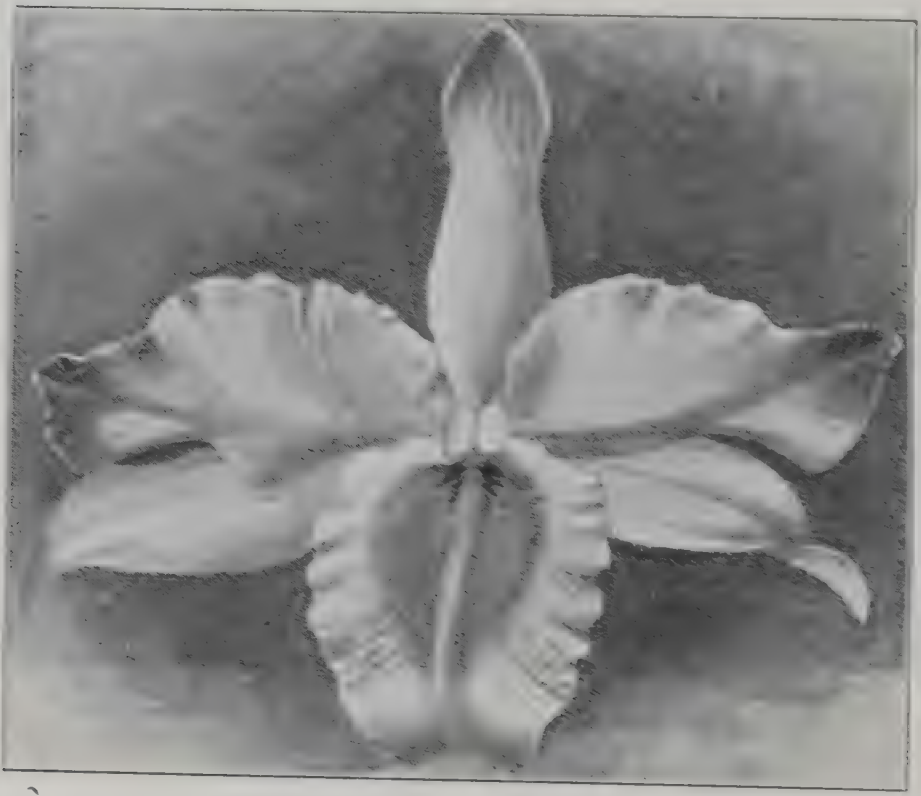


FIG. 30.—DENDROBIUM SCHNEIDERIANUM, WESTONBIRT VARIETY.
(*Journal of Horticulture.*) (p. lxxi.)

Silver Banksian Medal.

To Messrs. Sander, for rare species.

To Messrs. Hugh Low, for a group.

To Monsieur Mertens, for Odontoglossums.

To Mr. A. W. Jensen, for *Odontoglossum crispum* and *Cattleya Schröderae.*

Award of Merit.

To *Brassocattleya* × *Digbyano-Mendelii* perfecta (*B. Digbyana* × *C. Mendelii*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). A finely formed white flower tinged with pink and with cowslip-yellow disc to the fringed lip.

To *Dendrobium* × *Schneiderianum*, Westonbirt variety (*aureum* × *Findlayanum*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. Flowers of the size and form of *D. Findlayanum*, white with the tips of the segments rose. Disc of the lip deep orange. (Fig. 30.)

To *Sophrolaeliocattleya* × 'Olive' (*S.-l.* 'Psyche' × *C.* × 'Enid'), (votes, unanimous), from J. Gurney Fowler, Esq., Woodford (gr. Mr. J. Davis). A showy dwarf hybrid with flowers deep reddish-mauve with gold markings on the lip.

Cultural Commendation.

To Mr. H. G. Alexander, gr. to Lieut.-Col. G. L. Holford, C.I.E., C.V.O., for two magnificent specimens of *Cymbidium* × *eburneo-Lowianum*, the one with nineteen flower-spikes bearing together ninety-one flowers; the other thirty-two spikes with one hundred and fifty fine flowers.

Other Exhibits.

de B. Crawshay, Esq.: *Odontoglossum Lambeauianum.*

Mrs. Temple: *Lycaste Skinneri.*

J. Forster Alcock, Esq.: hybrid *Cypripedium.*

Mrs. Haywood: hybrid Dendrobiums.

Messrs. Keeling: *Odontoglossum nebulosum*, and tubes for storing Orchid pollen.

ORCHID COMMITTEE, APRIL 6, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-one members present.

Awards Recommended :—

Gold Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for Dendrobiums, &c.

Silver Flora Medal.

To H. S. Goodson, Esq. (gr. Mr. G. E. Day), for Odontoglossums, Odontiodas, &c.

To Messrs. Charlesworth, for hybrids.

To Messrs. Sander, for Cattleyas, &c.

To Messrs. McBean, for Odontoglossums.

To Messrs. J. Veitch, for a group.

Silver Banksian Medal.

To Mr. Jensen, for fine forms of *Cattleya Schroderae* and *Odontoglossum crispum.*

To Messrs. Hugh Low, for a group.

To Monsieur Mertens, Ghent, for hybrid Odontoglossums.

First-class Certificate.

To *Cattleya Schröderae* 'The Baron' (votes, unanimous) from Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt (gr. Mr. Alexander). The famous variety first shown at the Temple Show, 1905. Flowers of a delicate peach-blossom tint, the disc of the lip orange.

To *Cattleya Schroderae* 'Irene' (votes, 12 for, 4 against), from Mr. Jensen, Lindfield. A very large white flower tinged with lilac. (Fig. 31.)

To *Odontoglossum* × *percultum*, Cookson's variety (*ardentissimum* × *Rolfeae*) (votes, unanimous), from Norman C. Cookson, Esq. (gr. Mr. Chapman). A perfectly formed flower heavily blotched with purple on a white ground.

To *Odontioda* × 'Ernest Henry' (× *Odontoglossum* 'Queen Alexandra' × *Cochlioda Noezliana*), from H. S. Goodson, Esq. Flowers shaped like those of *O.* × *Charlesworthii*; mahogany-red with yellow crest to the lip. (Fig. 32.)

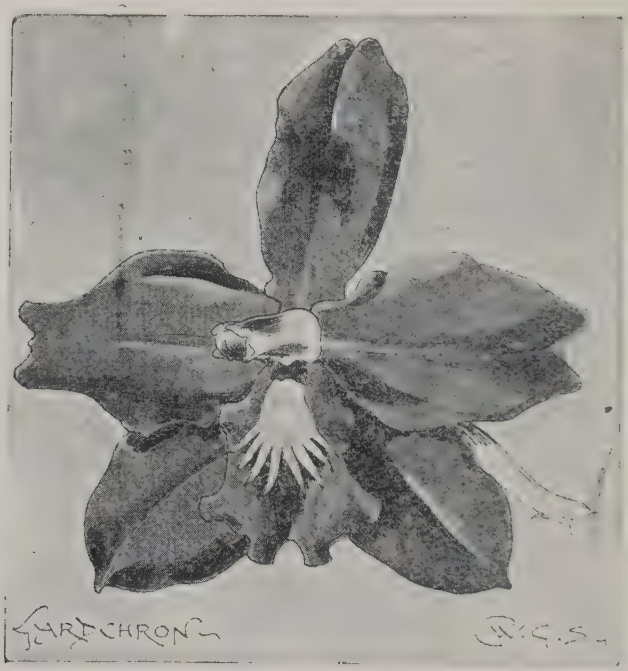


FIG. 32.—ODONTIODA × 'ERNEST HENRY.' (*Gardeners' Chronicle.*

Award of Merit.

To *Odontoglossum* × 'Sylvia,' Westonbirt variety (*cirrhosum* × *Rolfeae*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. Flowers yellowish, blotched with purple.

To *Cattleya Schroderae* 'Alexandra James' (votes, unanimous), from W. James, Esq., West Dean Park, Chichester. A large blush-white flower with yellow disc to the lip.

To *Odontoglossum* × 'Dreadnought' (× Prince Albert, nat. hyb. × *sceptrum*) (votes, 12 for, 2 against), from Messrs. Sander. Flowers resembling a very large *O. sceptrum* with the colour and markings of *O. triumphans.*

To *Laeliocattleya* × 'Frederick Boyle' var. *Kerchoveae* (*L. anceps alba* × *C. Trianaei alba*) (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O. (gr. Mr. W. H. White). Flowers uniformly blush-white.

To *Odontoglossum crispum* 'Angela' (votes, 13 for, 2 against), from

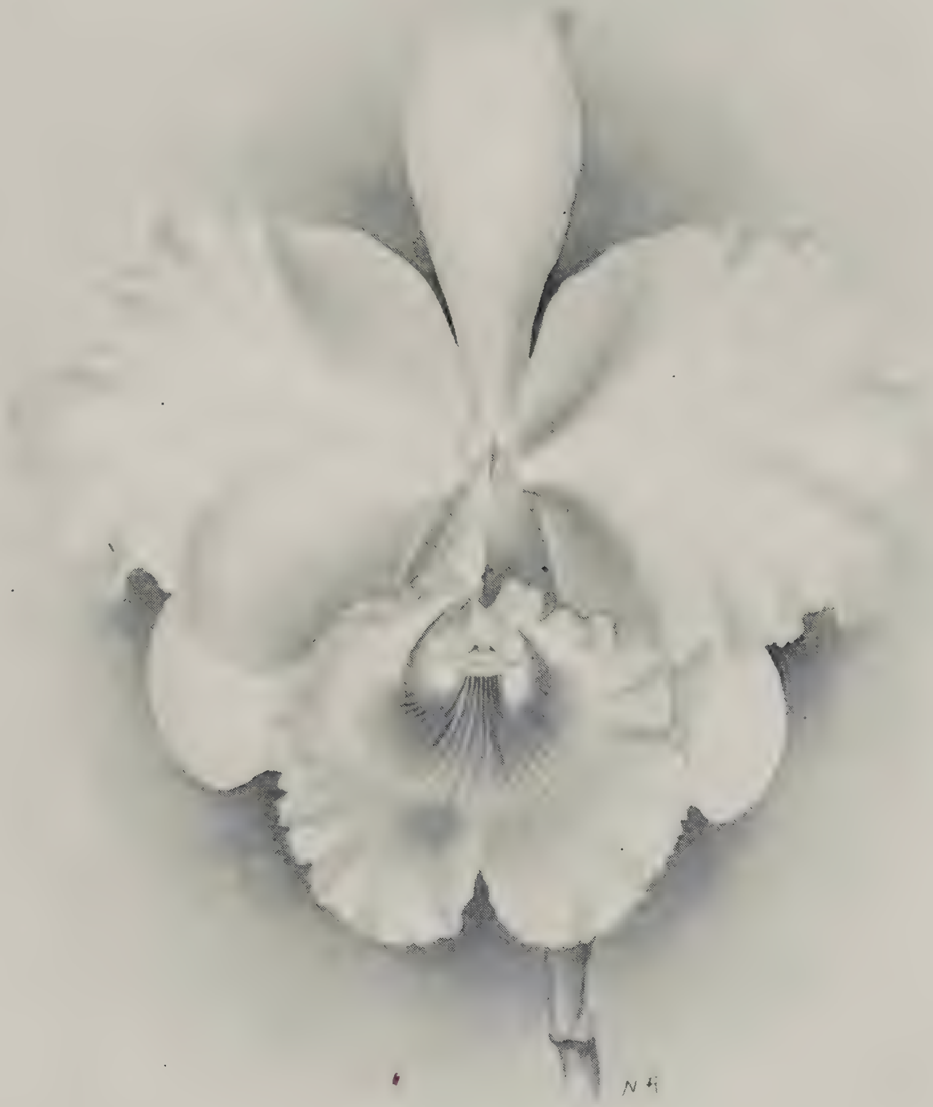


Fig. 31.—Cattleya Schroderae 'Irene.'

(*To face page* lxxii.)

Norman C. Cookson, Esq. A large white flower heavily blotched with purple.

Botanical Certificate.

To *Megaclinium purpureo-rachis*, from Sir Trevor Lawrence, Bart. A large species from tropical Africa. The inflorescence has a broad flat-bladed purple rachis, on each side of which is a row of small toad-like brownish flowers. (Fig. 33.)

To *Polystachya rhodoptera*, from Sir Trevor Lawrence, Bart. Stems slender, 1 ft.; flowers on the upper part, yellowish, tinged with rose.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: hybrid.
R. G. Thwaites, Esq.: hybrid Dendrobiums.
de B. Crawshay, Esq.: hybrid Odontoglossums.
Sir Trevor Lawrence, Bart., K.C.V.O.: rare species.
Messrs. Cypher: Dendrobiums.
Francis Wellesley, Esq.: *Cattleya Trianaei* 'Marie Feodorovna.'
W. Thompson, Esq.: Odontoglossums.
J. Forster Alcock, Esq.: Cypripediums.
J. S. Moss, Esq.: *Odontoglossum* × *Kenchii* (*Kegeljani* × *Denisoniae Mossiae*.

ORCHID COMMITTEE, APRIL 20, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-two members present.

Awards Recommended :—

Silver Flora Medal.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for a group.
To Messrs. Charlesworth, for rare Orchids.
To Messrs. Sander, for hybrids and interesting species.
To Messrs. Cypher, for Dendrobiums and Cattleyas.
To Messrs. Hugh Low, for a group.

Silver Banksian Medal.

To Mr. A. W. Jensen, for Cattleyas and Odontoglossums.

First-class Certificate.

To *Odontoglossum* × 'Theodora' (*Rossii rubescens* × *triumphans*) (votes, unanimous), from de B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. Stables). A remarkably pretty hybrid of dwarf habit. Flowers produced on short spikes. Sepals and petals canary-yellow, the greater part of their surface being covered with deep reddish-claret blotches. Lip white with a dark red curved blotch in front of the yellow crest. (Fig. 34.)

Award of Merit.

To *Laeliocattleya* × 'Goldcrest' (*C. Schröderae* × *L. Cowanii*), (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E. C.V.O. (gr.

Mr. H. G. Alexander). Flowers, ten or twelve on an erect spike, bright chrome-yellow.

To *Cattleya* × 'Robert de Wavrin' (*Schröderae* × *Schilleriana*) (votes, unanimous), from Lieut.-Col. G. L. Holford. A large flower, tinged with rose and having dark rose veining on the lip.

To *Odontoglossum* × *loochristiense aureo-fulvum* (*crispum* × *triumphans*) (votes, 13 for, 4 against), from Sir Trevor Lawrence, Bart., K.C.V.O. (gr. Mr. W. H. White). A pretty bright-yellow flower, blotched with chocolate. Lip white with brown spots.

To *Miltonia* × *Bleuana*, Sander's variety (*vexillaria* × *Roezlii*) (votes, unanimous), from Messrs. Sander, St. Albans. Flowers large and almost circular in form; white with violet tinge at the bases of the petals. Lip white with some red lines at the base.

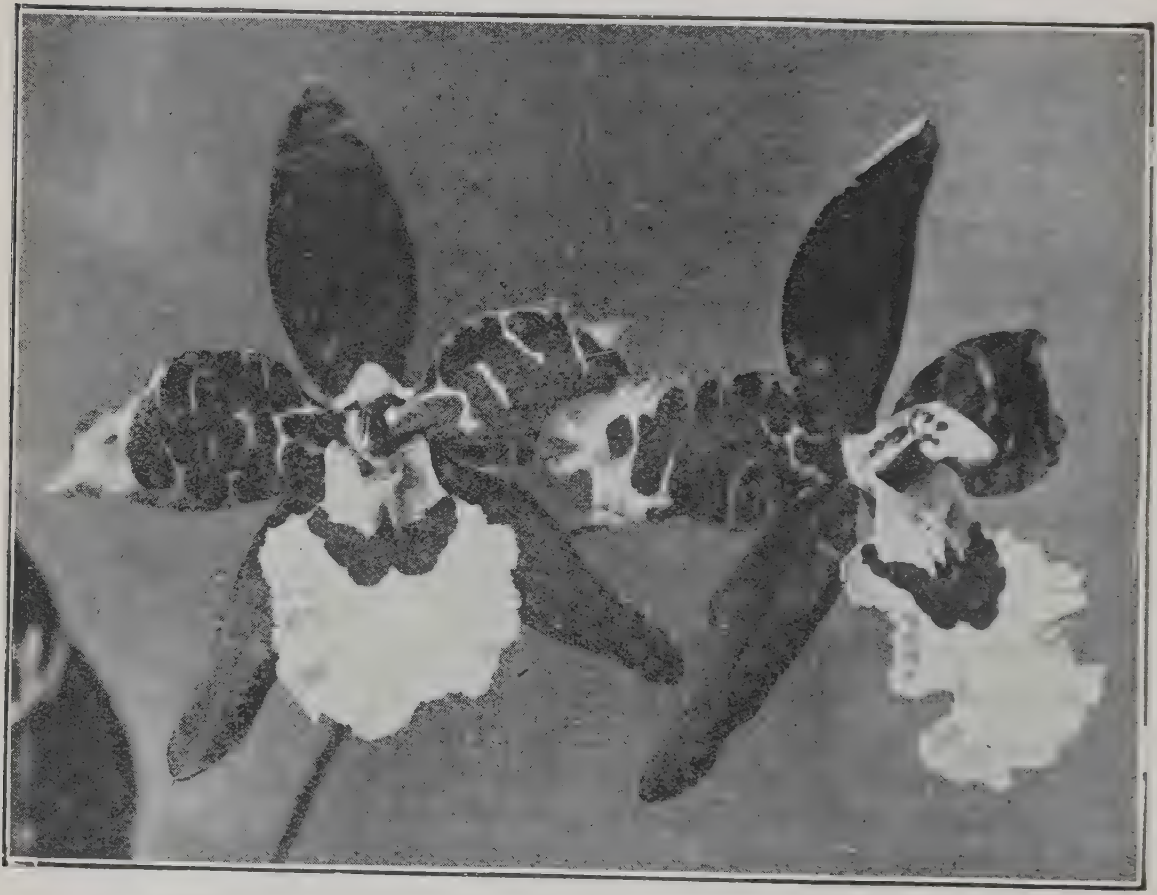


FIG. 34.—ODONTOGLOSSUM × 'THEODORA.' (*Gardeners' Chronicle.*)
(p. lxxiii.)

To *Epilaelia* × *Lionetii* (*E. atropurpureum* × *L. purpurata*) (votes, 14 for, 2 against), from Messrs. Charlesworth, Hayward's Heath. Flowers singly on an erect stem, rose colour.

Botanical Certificate.

To *Pleurothallis Birchenallii*, from Messrs. Charlesworth. Allied to *P. Scapha*. Sepals long, purple; petals linear, white.

To *Oncidium barbatum*, from Gurney Wilson, Esq., Haywards. Sepals and petals yellow barred with light brown; lip yellow, with a bearded margin to the side lobes.

Cultural Commendation.

To Mr. H. G. Alexander, Orchid grower to Lieut.-Col. G. L. Holford, C.I.E., C.V.O., for a fine specimen of *Odontoglossum Pescatorei*, with three spikes bearing 153 flowers.

To Mr. H. G. Alexander, for *Cattleya* × 'Enid,' with seven flowers on a spike.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., K.C.V.O., for three finely flowered *Dendrobium crepidatum*.

Other Exhibits.

Lieut.-Col. G. L. Holford: hybrid Orchids.
Sir Trevor Lawrence, Bart: Masdevallias.
The Duke of Marlborough: Odontoglossums.
Norman C. Cookson, Esq.: Odontoglossums.
de B. Crawshay, Esq.: hybrid Odontoglossums.

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INCORPORATED
1809.

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ROYAL HORTICULTURAL SOCIETY,

VINCENT SQUARE, WESTMINSTER, S.W.

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1. GENERAL.

Notices to Fellows are always added at the end of each number of the Journal, immediately preceding the Advertisements; also at the beginning both of the "Book of Arrangements" and of the "Report of the Council." Fellows are particularly requested to consult these Notices, as it would often save them and the Secretary much unnecessary correspondence.

2. LETTERS.

All letters on *all* subjects should be addressed—The Secretary, Royal Horticultural Hall, Vincent Square, Westminster, S.W.

3. TELEPHONE AND TELEGRAMS.

Telephone Number: **5363 WESTMINSTER.**
"**HORTENSIA, LONDON,**" is sufficient address for telegrams.

4. JOURNALS WANTED.

The Secretary would be greatly obliged by the return to the Society of ANY NUMBERS of the JOURNAL which may be of no further use to Fellows. Complete sets are occasionally applied for, but, at the present moment, not even one can be supplied owing to the stock of the following being exhausted:—

VOLUME X.
VOLUME XIII. Part 1.

These are therefore particularly asked for.

5. SUBSCRIPTIONS.

All Subscriptions fall due on January 1st of each year. To avoid the inconvenience of remembering this, Fellows can *compound* by the payment of one lump sum in lieu of all further annual payments; or they can, by applying to the Society, obtain a form of instruction to their bankers to pay for them every January 1st. It may be a week or more before the Tickets reach the Fellow, owing to the very large numbers, over 20,000, having to be despatched within the first month of the year. Fellows who have not already given an order on their bankers for the payment of their subscriptions each year are requested to do so, as this method of payment is preferred, and saves the Fellows considerable trouble. Forms for the purpose may be obtained from the R.H.S. Offices at Vincent Square, Westminster, S.W. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

In paying their subscriptions, Fellows often make the mistake of drawing their cheques for Pounds instead of for Guineas. Kindly note that in all cases it is Guineas, and not Pounds. Cheques and Postal Orders should be made payable to "The Royal Horticultural Society" and crossed "London and County Bank, Westminster."

6. FORM OF BEQUEST.

I give and bequeath to the Treasurer for the time being of the Royal Horticultural Society, London, the sum of £ ——, to be paid out of such part of my personal estate as I can lawfully charge with the payment of such legacy, and to be paid free of legacy duty, within six months of my decease; the receipt of such Treasurer to be a sufficient discharge for the same. And I declare that the said legacy shall be applied towards [the general purposes of the Society].*

7. PRIVILEGES OF CHEMICAL ANALYSIS.

Instructions are contained at page 74 in the "Book of Arrangements," 1909.

8. LIST OF FELLOWS.

A list of all the Fellows of the Society is sent out in January. Fellows are requested to look at their own names in it, and if in any way these are incorrect, or the addresses insufficient, they are requested to inform the Secretary at once. Forms of Nomination, and of the Privileges of Fellows, are bound in with every number of the JOURNAL and the "Book of Arrangements."

9. NEW FELLOWS.

The President and Council fully appreciate how much the prosperity of the Society and its present large number of Fellows is due to the efforts of Fellows to enlist the sympathy of their friends; and the steady advance during recent years indicates the increasing recognition of the Society's work and usefulness. But it must not be supposed that a maximum has yet been reached. There is ample room for a great increase of Fellows, in the North of England especially, as well as in America and the Colonies.

10. AN APPEAL.

What has been accomplished for the Society since 1887 is largely due to the unwearied assistance afforded by a small proportion of the Fellows; but as all belong to the same Society, so it behoves each one to do what he or she can to further its interests, especially in :—

1. Increasing the number of Fellows.
2. Helping to swell the General Prize Fund started by Mr. A. W. Sutton, V.M.H., for providing Prizes for the Students at Wisley; and also the special Nicholson Memorial Prize Fund.
3. Lectures with lantern slides.
4. Books are required to fill the gaps in the Library both at Vincent Square and at Wisley.
5. New and rare Plants and Seeds are wanted for the Garden and surplus roots for distribution to the Fellows.
6. Assisting in making Abstracts for the JOURNAL.

Thus there is plenty for all to do according to their individual liking: personal effort, money, plants, books, are all alike needed. The Secretary, therefore, asks those who read these lines to do their best to help in any of the ways above indicated.

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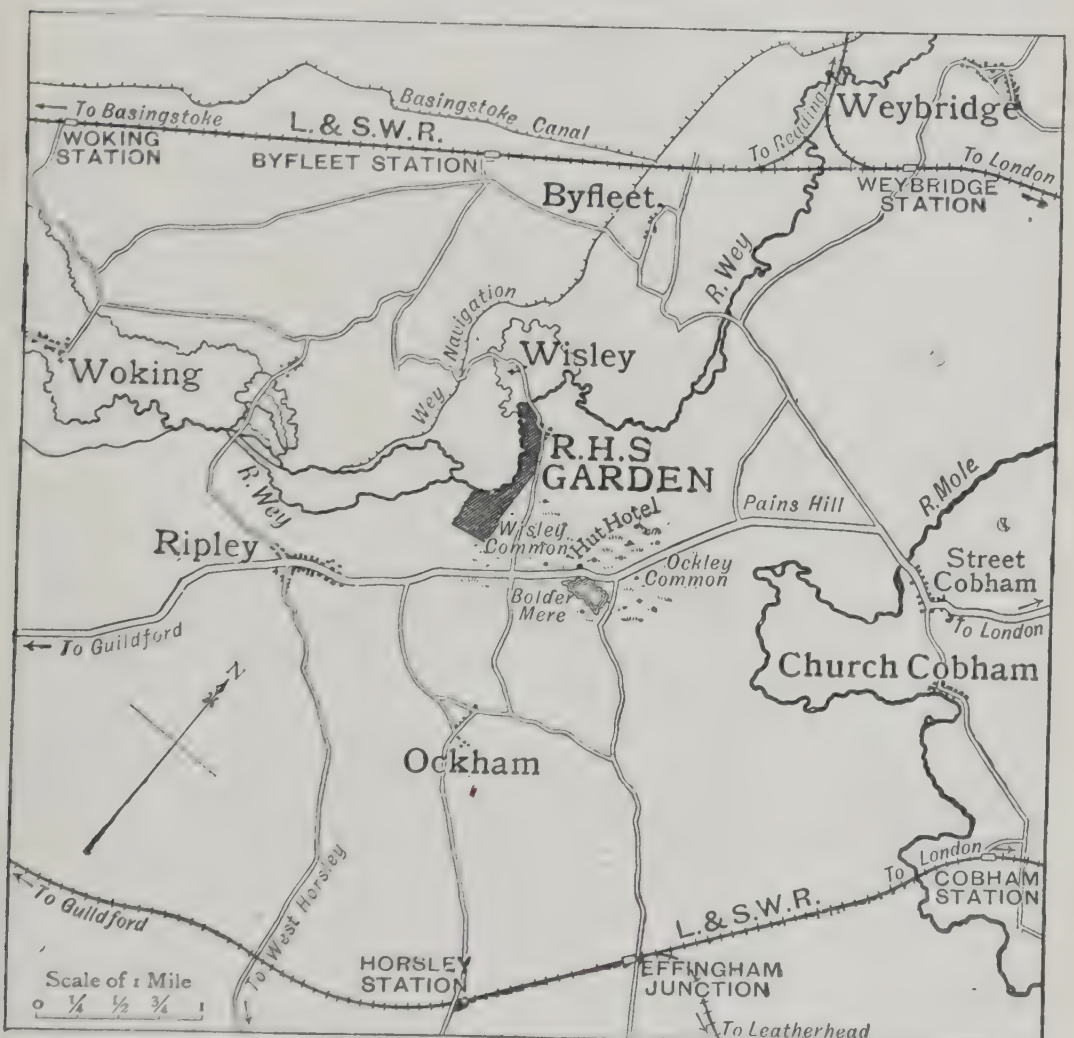
* Any special directions or conditions which the testator may wish to be attached to the bequest may be substituted for the words in brackets.

Since this paragraph last appeared a magnificent collection of Orchids has been given to the Society by Mr. J. W. Field, and a valuable binocular microscope by Mr. C. G. A. Nix—both gifts being most acceptable.

11. ABSTRACTS FOR JOURNAL.

Fellows (especially those who are interested in any of the numerous ways in which modern scientific researches affect Horticulture or Botany) will long ago have recognized the value of the ABSTRACTS from current periodical literature which appear in each issue of the JOURNAL. In order to keep these abstracts up to date, we are greatly in want of a few more volunteers to help in the work. The Periodicals are sent from the office to the Fellow undertaking to Abstract, and the return postage expenses are prepaid. Any Fellow willing to help in this way is requested to send name and address to the Secretary.



Walker & Cockerell sc.

POSITION OF THE SOCIETY'S GARDENS

12. THE SOCIETY'S GARDENS AT WISLEY.

The Gardens are open daily to Fellows and others showing Fellows' Transferable Tickets from 9 A.M. till sunset, except on Sundays, Good

Friday, Christmas Day, and Exhibition days. Each Fellow's ticket admits three to the Gardens. The Public are not admitted.

The Gardens, situated at Wisley (about 2 miles from Ripley, in Surrey), are about 3 miles from Byfleet, 3½ miles from Horsley, and 5½ miles from Weybridge, all stations on the South-Western Railway, with frequent trains from Waterloo and Clapham Junction. Carriages to convey four persons can be obtained by writing to Mr. D. White, fly proprietor, Ripley, Surrey; the charge being, to and from Weybridge, waiting two hours at the Gardens, 8*s.*; or waiting three hours, 10*s.*; or to and from Horsley, 7*s.*; Effingham Junction, 7*s.*; Byfleet, 7*s.* Visitors should in all cases be careful to state the trains they intend to arrive by and leave by. Carriages can also be obtained at Weybridge for 8*s.* by writing to Mr. Trembling, New Road, Weybridge. Excellent accommodation and refreshments can be had at the Hut Hotel, close to the Gardens, and also at the Hautboy at Ockham.

13. TRIALS AT WISLEY IN 1909-10.

Trials of the following Fruits, Flowers, and Vegetables at the Wisley Gardens during 1909 have been arranged.

N.B.—Everything sent for trial *must be named*, and the name and address of the Sender attached.

Fruits.—Autumnal Raspberries. **15 Canes of each variety to be sent at once.**

Flowers.—Tree Carnations. 4 plants of each variety to be sent in February, 2 for out-, 2 for in-doors.

Annuals. Seed to be sent in January.

Garden Dahlias, Show and Cactus excluded. 2 plants of each variety to be sent in April.

Early-flowering outdoor Chrysanthemums. 2 plants of each variety to be sent in April.

Pentstemons. 2 plants of each variety to be sent in April or seed in January.

Vegetables.—Potatos; each variety must be labelled as being "early," "mid-season," or "late." 20 tubers of each to be sent by February. Also experiments with one variety—viz. "The Factor" (20 tubers) —secured from as many varying sources as possible, under different soil and climatic conditions. Please send particulars of soil and climate.

Cauliflower. ¼ oz. of each variety.

Lettuce. ¼ oz. of each variety.

Kidney Beans. ½ pint of each variety.

All parcels should be addressed:—

If sent by post: The Superintendent, R.H.S. Gardens, Wisley, Ripley, Surrey.

If by rail: The Superintendent, R.H.S. Gardens, Wisley, Horsley Station, L. & S.-W.R., with advice by post to the Superintendent.

SEEDS SENT FOR TRIAL OTHER THAN THOSE INVITED IN THE ABOVE LIST.

1. Seeds, &c., of plants not included in the Annual Trial List will also be received and grown, as far as possible.

2. The Superintendent is instructed, in the case of all seeds thus sent and grown, to procure seeds of the already best existing similar varieties, and grow them alongside of the newly sent seeds.

3. The resulting plants, &c., will be from time to time (as convenient) submitted to the Committee meeting at Wisley, but the only awards made to such unsolicited plants will be "Commended" and "Highly Commended."

4. Any plants thus grown and tried will have perfect freedom to be retried whenever a regular fixed trial of their congeners takes place, which will, as far as practicable, be at intervals of two or three years.

14. THE WISLEY RESEARCH STATION.

The new Research Station and Laboratory at Wisley is now completed and work is in progress there. Mr. F. J. Chittenden, F.L.S., has been appointed Director of the Research Work on Scientific Matters affecting Practical Horticulture, and Lecturer to the Students. By the completion of this station a long-felt want has been met. In the United States, where so much good work has been done in this direction, all is paid for by the Government, but in this country we have to fall back on private individuals or on Societies.

15. STUDENTS AT WISLEY.

The Society admits young men, under 22 years of age, to study Gardening at Wisley. The curriculum now includes not only practical garden work in all the main branches of Horticulture, but also lectures, demonstrations, and elementary Horticultural Science in the Laboratory, whereby a practical knowledge of simple Garden Chemistry, Biology, &c., may be obtained. The Laboratory is equipped with the best apparatus procurable for Students. The training extends over a period of two years, with a progressive course for each year. Students can only enter at the end of September and at the end of March. Selected Students have also the advantage of attending certain of the Society's Shows and Lectures in London.

16. DISTRIBUTION OF SURPLUS PLANTS.

In a recent Report the Council drew attention to the way in which the annual distribution of surplus plants has arisen. In a large garden there must always be a great deal of surplus stock, which must either be given away or go to the waste heap. A few Fellows, noticing this, asked for plants which would otherwise be discarded; and they valued what was so obtained. Others hearing of it asked for a share, until the Council felt they must either systematize this haphazard distribution or else put a stop to it altogether. To take the latter step seemed undesirable. Why should not such Fellows have them as cared to receive such surplus plants? It was therefore decided to keep all plants till the early spring, and then give all Fellows alike the option of claiming a share of them by ballot.

Fellows are therefore particularly requested to notice that only waste and surplus plants raised from seeds or cuttings are available for distribution. Many of them may be of very little intrinsic value, and it is only to avoid their being absolutely wasted that the distribution was established. The great majority also are of necessity *very small*, and may require careful treatment for a time.

Fellows are particularly requested to note that a Form of Application and list to choose from of the plants available for distribution is sent in January *every year* to every Fellow, enclosed in the "Report of the Council." To avoid all possibility of favour, all application lists are kept until the last day of February, when they are all thrown into a Ballot; and as the lists are drawn out, so is the order of their execution, the plants being despatched as quickly as possible after March 1.

Of some of the varieties enumerated the stock is small, perhaps not more than twenty-five or fifty plants being available. It is therefore obvious that when the Ballot is kind to any Fellow he will receive all the plants exactly as he has selected, but when the Ballot has given him an unfavourable place he may find the stock of the majority of plants he has chosen exhausted. A little consideration would show that all Fellows cannot be first, and some must be last, in the Ballot. Application forms received after March 1 and before April 30 are kept till all those previously received have been dealt with, and are then balloted in a similar way. Fellows having omitted to fill up their application form before April 30 must be content to wait till the next year's distribution. The work of the Gardens cannot be disorganized by the sending-out of plants at any later time in the year. All Fellows can participate in the annual distribution *following* their election.

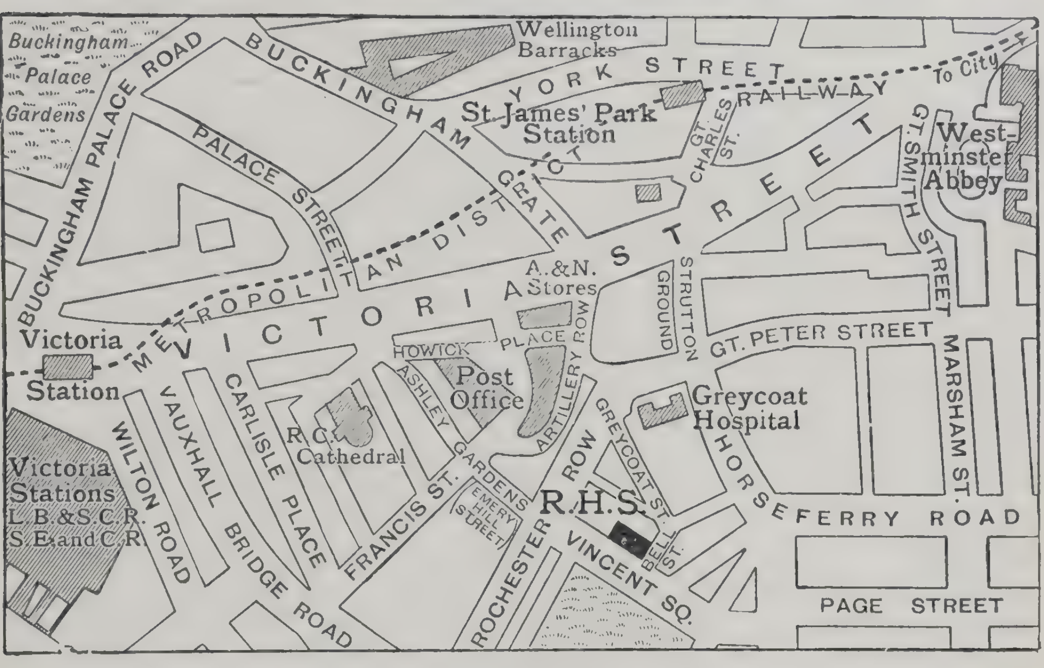
The Society does not pay the cost of packing and carriage. The charge for this will be collected by the carriers on delivery of the plants, which will be addressed exactly as given by each Fellow on his application form. It is impracticable to send plants by post, owing to the lack of Post Office facilities for despatch without prepayment of postage.

Fellows residing beyond a radius of thirty-five miles from London are permitted to choose double the number of plants to which they are otherwise entitled.

Plants cannot be sent to Fellows residing outside the United Kingdom, owing either to length of time in transit or to vexatious regulations in some foreign countries; but the Council will at any time endeavour to obtain for Fellows living abroad any unusual or rare seeds which they may have been unable to procure in their own country.

17. LETTING OF THE SOCIETY'S HALL.

The Royal Horticultural Hall and Offices are situated in Vincent Square, which lies straight through Ashley Gardens from Victoria Street, Westminster, and is about five minutes' walk from the Victoria and St. James's Park Stations.



Position of the Society's Hall.

Fellows are earnestly requested to make known among their friends and among other institutions that the Royal Horticultural Hall is available for Meetings, Shows, Exhibitions, Concerts, Conferences, Lectures, Balls, Banquets, Bazaars, Receptions, and other similar purposes. The Hall has a floor surface of 13,000 square feet. It is cool in summer and warm in winter. For a Concert it will seat 1,500, or for a public meeting 1,800. A Sound Board has recently been added, by which the acoustic properties are very greatly improved. It is undoubtedly the lightest Hall in London. The first floor, consisting of four rooms, may also be hired for similar purposes, either together or separately. A long-felt want has now been met by the construction of a convenient kitchen in the basement, with lift connections to the eastern annexe and lecture room. For serving luncheons, &c., this will prove a great boon. Ample cloak-rooms for ladies and for gentlemen are available. The regulations, &c., for hiring the Hall are printed in the "Book of Arrangements," and full particulars may be obtained on application to the Secretary, R.H.S., Vincent Square, Westminster, S.W., with whom dates may be booked.

18. EXHIBITIONS, MEETINGS, AND LECTURES IN 1909.

The programme will be found in the "Book of Arrangements" for 1909, issued at the end of January. It will be noticed that an

Exhibition and Meeting is held practically every fortnight throughout the year, and a short lecture on some subject connected with Horticulture is delivered during the afternoon.

A reminder of every Show will be sent in the week preceding to any Fellow who will send to the R.H.S. Offices, Vincent Square, S.W., a sufficient number (32) of halfpenny cards *ready addressed* to himself.

19. ERROR IN FELLOWS' TICKETS.

The entry of a Show on December 21 which appears on the Fellows' Tickets is an error. There will be no Show on that date, as it is found to be too near to Christmas.

20. BRITISH-GROWN FRUIT.

In consideration of the facts (1) that the annual Autumn Show of British-grown Fruits is every year practically a repetition of that of the previous year; (2) that many British-grown fruits cannot be shown in perfection at one Show; and (3) that vegetables have been somewhat neglected, the Council have decided to omit the great Autumn Show for one year, and in 1909 to substitute a series of prizes spread over twelve months, so that every fruit may have a chance of being seen at its best. A schedule of prizes will be found in the "Book of Arrangements" for 1909, and also in "The Book of Schedules" (see below).

21. AFFILIATED SOCIETIES' CHALLENGE CUP.

The Council offer a Challenge Cup to be competed for annually by the Affiliated Societies, subject to certain conditions (for which see "The Book of Schedules," 1909, price 6*d.*). The winners will hold the Cup for one year, and will also receive a Silver-gilt Knightian Medal, together with a set of their Publications and Charts presented to the Society by the Worshipful Company of Fruiterers.

22. "BOOK OF SCHEDULES."

The 1909 "Book of Schedules," containing revised Rules and Regulations for Exhibitors, &c., and full details of the Temple, Holland House, Colonial Fruit, and Bottled Fruit Shows, and a complete Schedule with Regulations for the Special Fruit and Vegetable Competitions at the Fortnightly Meetings, was issued on Thursday, February 25, price 6*d.*, and on receipt of this amount a copy will be forwarded by post immediately.

23. BOTTLED BRITISH FRUITS, &c., SHOW.

The Annual Exhibition of British Bottled Fruits will be held on December 1 to 4, 1909. Prizes and Medals are offered. See "Book of Schedules," 1909, issued on Thursday, February 25, post free, 6*d.*

24. COLONIAL-GROWN FRUIT SHOW, 1909.

An Exhibition of Colonial-grown Fruits and Vegetables will be held on December 1 to 4, 1909.

In holding this Show the Society's sole object is the advancement of the interest of the Colonies (*a*) by stimulating the production of better fruits; (*b*) by giving advice in the difficulties confronting Fruit Growers; and (*c*) by helping to inform the home market. Fruit Growers in the Colonies are asked to assist their own future competition in the markets of Great Britain by sending exhibits to this Exhibition, invitations to which are given to the Colonial and Government Offices, the Embassies, the leading London Fruit Merchants, Colonials on furlough, and others.

Particulars of the Show will be found in the "Book of Schedules" for 1909, issued on February 25, price 6*d*., post free.

25. SHOWS OF KINDRED SOCIETIES IN 1909.

The following dates have been fixed, on which R.H.S. Fellows' tickets will admit:—

March 24.—Perpetual Flowering Carnation Society.
April 20.—Auricula and Primula Society.
May 18.—Tulip Society.
July 21.—Carnation and Picotee Society.
July 23.—Sweet Pea Society.
September 16.—Rose Society.
December 8.—Perpetual Flowering Carnation Society.

Copies of the Schedules for these Shows may be obtained from the Honorary Secretary of each Society. For names and addresses see above dates in the "Book of Arrangements," 1909.

26. SPECIAL PRIZES, JULY-DECEMBER, 1909 AND 1910.

(1) CHALLENGE CUP FOR AFFILIATED SOCIETIES. (See p. lxxxiv.)

(2) APPLES AND PEARS.

The Worshipful Company of Fruiterers have presented the following prizes, which the Council have accepted and propose to award as follows:—

On October 12: a set of Publications with Charts and Handbook for the Affiliated Societies. (See "Book of Schedules.")

November 23: the Company's medals for (*a*) three dishes of Dessert and six of Cooking Apples, distinct; and for (*b*) seven dishes of Dessert and two of Cooking Pears, distinct. (See "Book of Schedules.")

(3) HOME-BOTTLED FRUITS.

The Council have accepted the offer of a Mercia Sterilizer from Miss Edith Bradley for award at the Show of Home-Bottled Fruits to be held on December 1 to 4, 1909. (See "Book of Schedules," post free, 6*d*.)

SPECIAL PRIZES, 1910.

(4) Apple 'Encore.'

Messrs. Cheal have intimated their willingness to present to the Society a series of seven prizes for a dish of the new Apple 'Encore,' to be awarded at the great Autumn Show of British-grown Fruits in October 1910. First, 20*s.*; second, 17*s.* 6*d.*; third, 15*s.*; fourth, 12*s.* 6*d.*; fifth, 10*s.*; sixth, 7*s.* 6*d.*; seventh, 5*s.*

(5) Forced Hyacinths.

The Council of the Royal Horticultural Society have accepted the offer of the following prizes from the General Bulb Growers' Society at Haarlem, to be competed for in March 1910:—

Division I.—For Amateurs and Gentlemen's Gardeners.

Class 3.—Eighteen Hyacinths, distinct.

1st Prize . .	£6 6*s.*	4th Prize . .	£3 3*s.*
2nd " . .	£5 5*s.*	5th " . .	£2 2*s.*
3rd " . .	£4 4*s.*	6th " . .	£1 1*s.*

Class 4.—Twelve Hyacinths, distinct.

1st Prize . .	£5 5*s.*	4th Prize . .	£2 2*s.*
2nd " . .	£4 4*s.*	5th " . .	£1 1*s.*
3rd " . .	£3 3*s.*		

Class 5.—Six Hyacinths, distinct.

1st Prize . .	£2 2*s.*	3rd Prize . .	£1 1*s.*
2nd " . .	£1 10*s.*	4th " . .	£0 10*s.*

Class 6.—Four pans containing Hyacinths, ten roots of one variety in each pan. The blooms of each pan to be of distinctly different colour to those of the other three pans.

1st Prize . .	£4 4*s.*	3rd Prize . .	£2 2*s.*
2nd " . .	£3 3*s.*	4th " . .	£1 1*s.*

Division II.—For Trade Growers.

Class 7.—Collection of 200 Hyacinths, in at least 36 varieties, grown in pots or glasses.

Prize. The Gold Medal of the General Bulb Growers' Society at Haarlem.

Class 8.—Collection of 200 Hyacinths, in 20 varieties, in pans; 10 roots of one variety in each pan.

Prize. The Gold Medal of the General Bulb Growers' Society at Haarlem.

Regulations.—For Classes 3, 4, and 5, each bulb must be in a separate pot (size optional). Classes 3, 4, 5, and 6 must all be single spikes; no spikes may be tied together. Exhibitors may only compete in one of the Classes numbered 3, 4, and 5.

All the bulbs must have been forced entirely in Great Britain or Ireland.

27. LECTURES.

The new Lecture Room is fitted with an electric lantern of the most modern construction; electric current, gas, and water are laid on, and every provision has been made for the illustration and delivery of Lectures.

Any Fellows willing to Lecture, or to communicate Papers on interesting subjects, are requested to communicate with the Secretary.

28. "THE MASTERS LECTURES."

Fellows will remember the intimate connection with the Society of the late Dr. Masters, F.R.S., who did much for horticulture by drawing constant attention to the various ways in which scientific discovery and research might be made serviceable to gardening; and it will also be remembered that a fund was established by subscriptions to perpetuate his memory in connection with the Society and to carry on in some degree his work of science in relation to gardening.

"The Masters Lectures" have accordingly been founded, and the first two are to be given during 1909 by the well-known Professor Hugo de Vries, of Amsterdam, on (*a*) "Masters' 'Vegetable Teratology,'" Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., in the Chair (June 22), and (*b*) "The Production of Horticultural Varieties," Chairman Professor W. Bateson, F.R.S., V.M.H. (September 28).

In 1910 Mr. A. D. Hall, M.A., F.R.S., will be the Masters Lecturer.

29. EXAMINATIONS, 1910.

1. The Annual Examination in the Principles and Practice of Horticulture will be held on Wednesday, April 20, 1910. The examination has two divisions, viz. (*a*) for Candidates of eighteen years of age and over, and (*b*) for Juniors *under* eighteen years. Candidates should send in their names not later than March 30. Full particulars may be obtained by sending a stamped and directed envelope to the Society's Offices. Copies of the Questions set from 1893 to 1909 (price 2*s*. post free) may also be obtained from the Office. The Society is willing to hold an examination wherever a magistrate, clergyman, schoolmaster, or other responsible person accustomed to examinations will consent to supervise one on the Society's behalf.

The Society is prepared to extend this examination to residents in the Colonies; and, at the request of the Government of the United Provinces of India, this test was held in 1909—altered and adapted to the special requirements of India—at Saharanpur and Calcutta.

In connection with this examination a Scholarship of £25 a year for two years is offered by the Worshipful Company of Gardeners, to be awarded after the 1910 examination to the student who shall pass highest, if he is willing to accept the conditions attaching thereto. The main outline of these conditions is that the holder must be of the male sex, and between the ages of 18 and 22 years, and that he should study gardening for one year at least at the Society's Gardens at Wisley, conforming to the general rules laid down there for Students. In the second year of the Scholarship he may, if he like, continue his studies at some other place at home or abroad which is approved by the Council of the Society. In case of two or more eligible Students being adjudged equal, the Council reserve to themselves the right to decide which of them shall be presented to the Scholarship.

2. The Society will hold an Examination in Cottage Gardening on Wednesday, April 27, 1910. This examination is intended for, and is confined to, Elementary and Technical School Teachers. It is undertaken in view of the increasing demand in country districts that the Schoolmaster shall be competent to teach the elements of Cottage Gardening, and the absence of any test of such competence. The general conduct of this examination will be on similar lines to that of the more general examination. Questions on Elementary Chemistry and Biology are now added to this examination.

3. The Society will hold an examination in the Royal Horticultural Hall, Vincent Square, S.W., on Monday, January 10, 1910, for gardeners employed in Public Parks and Gardens belonging to County Councils, City Corporations, and similar bodies. The entries close on January 1, 1910.

Medals and Certificates are awarded and Class Lists published in connection with these examinations, and the Syllabus may be obtained on application to the Secretary R.H.S., Vincent Square.

30. INFORMATION.

Fellows may obtain information and advice from the Society as to the names of flowers and fruit, on points of practice, insect and fungoid attacks, and other questions by applying to the Secretary R.H.S., Vincent Square, Westminster, S.W. Where at all practicable it is particularly requested that letters and specimens may be timed to reach Vincent Square by the first post on the mornings of the Fortnightly Meetings, so as to be laid before the Scientific or other Committees at once.

31. INSPECTION OF FELLOWS' GARDENS.

The Inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz. a fee of £3 3*s.* for one day (or £5 5*s.* for two consecutive days), together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their gardens. Gardens can only be inspected at the *written* request of the *owner*.

32. AFFILIATION OF LOCAL SOCIETIES.

One of the most successful of the many new branches of work undertaken since the reconstruction of the Society in 1887 is the unification of local Horticultural Societies by a scheme of affiliation to the R.H.S. Since this was initiated no fewer than 200 Societies have joined our ranks, and the number is steadily increasing.

The Parent Society is this year offering a Silver Challenge Cup to be competed for by Affiliated Societies. (See "Book of Schedules," price 6*d.*, under date October 12.)

To the privileges of Affiliated Societies have been added all the benefits accruing under the scheme recently introduced for the Union of Horticultural Mutual Improvement Societies.

Secretaries of Affiliated Societies can obtain on application a specimen of a Card which the Council have prepared for the use of Affiliated Societies for Certificates, Commendations, &c. Price 3*s.* 6*d.* for 10 copies, 5*s.* 6*d.* for 20, 11*s.* 6*d.* for 50, 20*s.* for 100.

The Council have also struck a special Medal for the use of Affiliated Societies. It is issued at cost price in Bronze, Silver, and Silver-gilt—viz. Bronze, 5*s.* 6*d.*, with case complete; Silver, 12*s.* 6*d.*, with case complete; Silver-gilt, 16*s.* 6*d.*, with case complete. Award Cards having the Medal embossed in relief can be sent with the Medal if ordered, price 6*d.* each.

33. UNION OF HORTICULTURAL MUTUAL IMPROVEMENT SOCIETIES.

This Union has been established for the encouragement and assistance of Horticultural Mutual Improvement Societies, the object being to strengthen existing Societies, to promote interchange of lecturers, to provide printed lectures, and if possible to increase the number of these useful Societies.

A list of lecturers and their subjects, and also a list of typewritten lectures, with or without lantern slides, prepared by the Society, may be obtained from the Secretary R.H.S., price 3*d.*

The Secretary will be glad to hear from lecturers who are willing to lecture to such Societies, that he may enroll them in the Register of Lecturers and bring them into touch with Societies requiring assistance. Others may like to send to him written lectures (with or without lantern slides), that he may have them printed for circulation among these Societies.

Lantern slides on horticultural topics are urgently needed, and their gift will be very much appreciated.

The annual Meeting of the Delegates will be held at 4 P.M. on October 12.

34. COLOUR CHART.

Hardly a gardener or florist exists who has not at times longed for a COLOUR CHART—that is to say, for a standard of reference whereby he could himself name, or recognize, or convey to a friend at a distance, the *exact* shade of colour of a flower he desired to procure or had seen advertised, or wished to commend to a friend. Take, for example, the word "crimson"; what a multitude of colours and shades it may be made to include! Some, very beautiful; some, horrible concoctions of red and blue crudely combined.

The Council of the Society have long felt the need of such a Colour Chart, but the huge expense of production has hitherto deterred them from issuing it.

Not long since an admirable chart, containing more than 1,450 shades of colour between white and black, was published at the instance of the French Chrysanthemum Society, the price being £1 1*s*. net, and by it it is now possible to *exactly* recognize or describe to a friend or purchaser at a distance the precise colour of any possible flower. You may have met with an Azalea, for instance, which greatly strikes your fancy; you take out your Chart and match its shade, and describe it to your friend or your nurseryman as, "Colour: Apricot, p. 53, shade 3," and he turns to his Chart and sees *exactly* what it is you want or describe. Or you want to make someone understand the exact shade of a rose in the way of "Andersoni," and you need only say, "Rosy pink, p. 118, shade 4," and your correspondent turns to his Chart and sees in a moment exactly what it is you want to describe. Or a nurseryman, having raised a new variety, can by simply quoting "Colour Chart, p. —, shade —," exactly represent to his customers the colour-beauty of his new introduction.

The Council recognizing both the excellence and the usefulness of this Chart, the idea at once occurred: Could it not be adopted as an International Standard, so that all lovers of flowers all over the world could accurately and exactly describe to one another (no matter how far away or speaking what language) the colour and shade of any particular flower they refer to? There seemed no other difficulty than the somewhat prohibitive cost of £1 1*s*. net. But difficulties only exist to be overcome, and by undertaking to be responsible for a very large number the Society is now in a position to offer this Chart to its Fellows at the reduced cost of 14*s*. 6*d*., for which price it can be obtained at the Society's Offices, Vincent Square, or it can be sent free by post for 15*s*.; but in all cases a cheque or postal order must be sent beforehand.

This Chart will, of course, be found vastly useful for many other purposes; for example, a lady wishing to match a certain shade has only to refer her dressmaker to such and such a colour on p. —, shade —, and it can be infallibly matched. An artist wishing to describe the colour of the sky on a certain sundown can do so exactly by reference to the Chart. And in many other like ways it must prove generally useful, containing as it does every possible shade of colour between black and white.

The Council hope that Fellows will avail themselves freely of this offer, as unless a very large number of copies are purchased a great loss will accrue to the Society.

35. MONOGRAPH ON FUNGOID PESTS.

The attention of Fellows is directed to a handsome volume published by the Society on "Fungoid Pests of Cultivated Plants," by Dr. M. C. Cooke, V.M.H. It consists of 280 pages of letterpress, and is illustrated with 24 coloured plates, containing figures of 360 different fungoid attacks, and 23 woodcuts. It also contains a Chapter on Fungicides, which explains clearly how to make the different washes and sprays, and gives the proportions in which the various ingredients should be used. The whole work is written so as to interest and instruct the cultivator in the simplest and most practical manner. The volume makes an admirable school prize or gift to a gardener or student of nature. Price 5*s.*, R.H.S. Office, Vincent Square.

"No one whose plants are subject to fungoid attacks—and whose are not?—should be without this book; for not only can they by its use identify the disease at once, but they are also told both how to treat it and overcome it, and also how to make the different washes and sprays which the different classes of fungoid attacks require."

36. RULES FOR JUDGING—1909 CODE.

The "Rules for Judging, with Suggestions to Schedule Makers and Exhibitors," have again been further revised and considerably modified from the experience gained during the last few years. Special attention is drawn to the amended Rule defining "an amateur," with suggestions for establishing four distinct classes of amateurs to meet the requirements of larger or smaller local Societies. The "pointing" recommended for fruits and vegetables has also been considerably amended, and the terms "annuals" and "biennials" further explained. The secretaries of local Societies are advised to obtain a fresh copy. It will be sent post free on receipt of a postal order for 1*s.* 6*d.*, addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W.

37. VARIETIES OF FRUITS.

Many people plant Fruit trees without a thought of what Variety they shall plant, and as a result almost certain disappointment ensues, whilst for an expenditure of 2*d.* they can obtain from the Society a little 16-page pamphlet which contains the latest expert opinion on Apples, Pears, Plums, Cherries, Raspberries, Currants, Gooseberries, and Strawberries, together with Notes on Planting, Pruning, and Manuring, which for clearness of expression and direction it would be impossible to surpass. It has in fact been suggested that no other 16 pages in the English language contain so much and such definite information. At the end of the pamphlet are given the names of some of the newer varieties of Fruits, which promise well, but are not yet sufficiently proved to be recommended for general planting.

Copies of this pamphlet for distribution may be obtained at the Society's Office, Vincent Square, Westminster. Price, post free: single copy, 2*d*., or 25, 2*s*.; 50, 3*s*.; 100, 4*s*.

38. INTERNATIONAL HORTICULTURAL EXHIBITION.

1911.

PRELIMINARY NOTICE.

The President and Council of the Royal Horticultural Society have decided to organise an INTERNATIONAL HORTICULTURAL EXHIBITION in London, in 1911 or 1912.

Definite dates and further particulars will be issued in the Autumn.

W. WILKS, *Secretary.*

By order of the Council.

39. ADVERTISEMENTS.

Fellows are reminded that the more they can place their orders with those who advertise in the Society's Publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

May 4, 1909.

Sir Daniel Morris, K.C.M.G., V.M.H., in the Chair.

Fellows elected (55).—F. H. Appleby, Edwin Bale, Mrs. R. Balfour, Miss M. Bonham-Carter, Miss M. Chandos-Pole, S. G. Covell, Mrs. T. Dyer Edwards, Miss L. Elderton, Ivor A. B. Ferguson, Mrs. Freeman, G. W. Gibson, Mrs. G. Gordon-Lennox, W. E. Gray, Mrs. Arthur Grenfell, R. Halford, Mrs. Hartopp, F. S. Harvey, Miss C. Hitchings, Miss A. M. S. Hoare, Mrs. C. T. Hoare, R. W. Hodder, Mrs. Hurst, J. Lindsay Johnston, J.P., Oscar Lewisohn, M. Loasby, Major M. L. MacEwen, A. G. Mallins, W. Mathieson, Miss S. F. May, Lady Menzies of Menzies, Miss M. W. Morcom, Mrs. F. Morgan, Miss Nicoll, Lady Nottage, T. L. Oakley, J. Aikman Paton, M.A., B.Sc., Miss M. Pelham, C. J. Porter, E. A. Potter, Mrs. Peter Ralli, Mrs. E. Ferner Rowe, Mrs. C. G. Rutherford, Walter Smith, A. F. Sotheby, Mrs. St. John Sperling, Mrs. G. Stevens, H. S. Stoneham, George Taylor, Miss A. Townshend, Mrs. Tyringham, J. Udale, Lady Vavasour, G. S. Warren, A. Wolton, F. Wynne.

Fellows resident abroad (4).—G. Bony (France), J. K. M. L. Farquhar (U.S.A.), F. Howell (Hong Kong), L. H. S. Pieris (Ceylon).

Associate (1).—W. Benbow.

Societies affiliated (2).—Colchester Gardeners' Association, Leamington and County Flower Show.

A lecture was given on "Mendel's Law and its Application to Horticulture" by Mr. C. C. Hurst, F.L.S.

GENERAL MEETING.

May 18, 1909.

Mr. W. A. Bilney, J.P., in the Chair.

Fellows elected (131).—Capt. A. B. Baillie, Mrs. Balgny, Miss Barber, H. H. Barrett, G. Baleman, Mrs. E. à C. Bergne, F. W. Bois, Mrs. Booth, J. H. Boraston, Mrs. H. P. Boulnois, J. W. S. Bourne-May, Mrs. Brace, Mrs. M. Boyd Bredon, Miss Broadhurst, P. M. Buck, Mrs.

Bullivant, Miss M. Bullivant, Mrs. J. C. Bumsted, Rev. T. Buncombe, C. Burgoyne, W. F. Burnett, Mrs. Caddow, Miss Cannon, Mrs. P. Anderson Carrie, Mrs. A. H. Carrington, Mrs. Henry Cautley, Mrs. C. Church, Mrs. F. E. Colman, Miss Lena Cooper, Mrs. L. Cunliffe, J. H. Dale, Mrs. Vere B. Davies, Miss L. S. J. Deacon, Le Comte de Mauny-Talvande, H. F. Dodgson, H. C. Dowling, Miss L. A. Dunington, C. M. Ellison, Mrs. F. A. English, Capt. C. W. B. Farrant, Mrs. Firth, C. Fisher, R. G. Fricker, A. B. Gill, Miss L. Grant, C. S. Gulbenkian, F.R.G.S., Miss C. S. Hadwen, Miss A. L. Hall, Mrs. J. Hamilton-Evans, Mrs. Hamond, Col. J. Compton Hanford, Miss N. C. Hardy, P. Hargreaves, Miss F. Hartridge, Mrs. G. Booth Heming, A. Hoadley, Mrs. H. W. Horne, Viscountess Howick, Campbell Inglis, W. E. T. Ingwersen, Miss E. A. Jameson, Miss B. Johnston, Fred. W. Jones, Mrs. Douglas Joy, Mrs. P. Laming, Mrs. A. Lanyon, R. Lawson, J. Lion, Mrs. E. Llewellyn, Mrs. W. Loch, Mrs. E. Lovell, Dr. A. J. M. MacLaughlin, D. J. McMartin, Sir Kenneth Matheson, Bart., L. J. Meakin, Miss A. Morier, F. W. Monks, J.P., Mrs. Muller, L. Mutimer, F. Neave, Mrs. F. M. Nevill, Mrs. Newbigging, Rev. E. J. Newill, F. E. Newman, G. H. Norris, Mrs. Campbell Ogilvie, H. A. Parker, Mrs. F. G. W. Parker, Hon. William Peel, M.P., J. H. Rainbow, Miss E. Rattray, F. M. Remnant, J.P., E. E. Robinson, N. B. Robinson, Mrs. T. E. A. Robinson, Mrs. Simpson Rostron, R. Rowe, L. E. Rydout, F. G. Sage, P. R. Sargood, J. Loudoun Shand, Mrs. A. H. Sharp, Miss G. S. Sheppard, W. F. T. Sheridan, Lieut.-Col. Sir Gerard Smith, Edward Smith, Miss A. A. G. Smith, Reginald H. Smith, Reginald Soames, Mrs. C. E. Stewart, E. Swalwell, H. J. Talbot, B.A., Miss Thomson-Glover, Mrs. E. Tillyer-Blunt, Mrs. Tocher, C. B. Todd, Mrs. Townend, D. Toye, N. Trotter, Mrs. G. Unwin, Mrs. Hall Walker, J. C. Warburg, Mrs. T. Weller-Poley, Mrs. J. W. Western, John C. White, C.I.E., Col. A. J. Willcocks, Mrs. Wilson, Mrs. Winn, A. Wollersen, S. Reginald Wright, H. Wrightson.

Fellows resident abroad (3).—R. Adnet (France), Countess Lutzow (Bohemia), A. Venkatraman (Madras).

Associates (5).—Miss G. Bath, J. Boland, J. Fagence, T. Smith, F. Stirling.

Society affiliated (1).—Eynsford Horticultural Society.

A lecture on "Alpines in their Native Homes" was given by Mr. A. Clutton-Brock (see p. 166).

TEMPLE SHOW.

May 25, 26, 27, 1909.

JUDGES.

Orchids.	Roses.
Chapman, H. J.	Jefferies, W. J.
Fowler, J. Gurney, J.P.	Jennings, John
Little, H.	May, H. B.
Wellesley, F.	Shea, C. E.

CARNATIONS.

Douglas, Jas., V.M.H.
Blick, Chas.
Turner, Arthur.

TULIPS.

Baker, W. G.
Walker, Jas.
Ware, W. T.

FRUIT AND VEGETABLES.

Rollit, Sir Albert, D.L.
Challis, T., V.M.H.
Poupart, W.
Nix, C. G. A.

GROUPS IN OPEN AIR.

Chapman, A.
Crump, W., V.M.H.
Pearson, A. H., J.P.
Thomson, D. W.

HARDY HERBACEOUS PLANTS.

Beckett, E., V.M.H.
Bowles, E. A., M.A.
Grandfield, J.

ROCK AND ALPINE PLANTS.

Bilney, W. A., J.P.
Clutton-Brock, A.
Lynch, R. Irwin, V.M.H.
Moore, F. W., V.M.H.

FOLIAGE PLANTS.

Bain, W.
Barnes, N. F.
Hudson, J., V.M.H.
McLeod, J. F.

FLOWERING PLANTS.

Fielder, C. R.
Howe, W.
Paul, G., V.M.H.
Reynolds, G.

MISCELLANEOUS.

Dixon, C.
Kingsmill, A.
Notcutt, R. C.
Odell, J. W.

SPECIAL ORCHID PRIZES.

White, W. H.
Bound, W. P.
Crawshay, de Barri.

AWARDS GIVEN BY THE COUNCIL AFTER CONSULTATION WITH THE JUDGES.

The order in which the names are entered under the several medals and cups has no reference whatever to merit, but is purely accidental.

The awards given on the recommendation of the Floral and Orchid Committees will be found in their respective reports.

Gold Medal.

Mr. H. Burnett, for Carnations.
Messrs. Charlesworth, for Orchids.
Messrs. W. Cutbush, for rock and water garden.
Messrs. H. B. May, for flowering plants and ferns.
Messrs. W. Paul, for Roses and ornamental trees and shrubs.
Messrs. Paul, for Roses, Lilacs, and new shrubs.
Messrs. Jas. Veitch, for flowering and foliage plants.
Messrs. Wallace, for hardy plants and rock garden.
Messrs. J. Waterer, for Rhododendrons.

Silver Cup.

Sir Jeremiah Colman, Bart. (gr. Mr. Collier), for Orchids.
Leopold de Rothschild, Esq. (gr. Mr. Reynolds), for *Vanda teres*.
Mrs. Kershaw Wood (gr. Mr. Gould), for Orchids and Gloxinias.

The American Carnation Co., for Carnations.
Messrs. Armstrong & Brown, for Orchids.
Messrs. J. Backhouse, for miniature rock garden.
Messrs. Barr, for hardy plants and pygmy trees.
Messrs. Bell & Sheldon, for Carnations.
Messrs. H. Cannell, for Cannas and Cacti.
Messrs. F. Cant, for Roses.
Messrs. J. Carter, for alpines, flowering plants, &c.
Messrs. J. Cheal, for trees and shrubs, alpine and rock garden.
Messrs. J. Cripps, for Japanese Maples.
Messrs. W. Cutbush, for Roses, Carnations, clipped trees, &c.
Messrs. R. & G. Cuthbert, for Azaleas.
Messrs. Alex. Dickson, for Roses and Tulips.
The Craven Nursery Co., for rare alpines.
Messrs. Hobbies, for Roses.
Messrs. G. Jackman, for Clematis and hardy flowers.
Messrs. R. P. Ker, for Amaryllis.
Mr. G. Mount, for Roses.
Mr. Amos Perry, for water garden and hardy flowers.
Mr. G. Reuthe, for alpines, Tulips, and rare shrubs.
Messrs. T. Rivers, for fruit trees in pots.
Mr. L. R. Russell, for flowering trees and shrubs.
Messrs. Sander, for Orchids and foliage plants.
Messrs. Sutton, for greenhouse plants.
Messrs. J. Veitch, for hardy plants and shrubs.

Silver-gilt Flora Medal.

R. Adnet, Esq., for hybrid Gerberas.
Frank Lloyd, Esq., for plants of *Begonia Lloydii.*
Messrs. Bakers, for Sweet Peas and hardy flowers.
Messrs. R. H. Bath, for Tulips and Carnations.
Messrs. Blackmore & Langdon, for Begonias.
Messrs. B. R. Cant, for Roses.
Mr. A. F. Dutton, for Carnations.
Messrs. W. Fromow, for Japanese Maples.
Messrs. J. Hill, for ferns.
Messrs. H. Low, for Orchids, Carnations, and Roses.
Messrs. J. W. Moore, for Orchids.
Messrs. J. Peed, for Caladiums.
Mr. M. Prichard, for alpine and rock plants.
Mr. C. Turner, for Roses and Azaleas.
Messrs. T. S. Ware, for alpines, Begonias, and Carnations.
Mr. C. F. Waters, for Carnations.

Silver-gilt Knightian Medal.

Messrs. G. Bunyard, for fruit trees in pots.
Mr. S. Mortimer, for Carnations, cucumbers, and tomatos.

Silver-gilt Banksian Medal.

Messrs. W. Bull, for Orchids and foliage plants.
Mr. R. C. Notcutt, for hardy flowers.

Mr. W. H. Page, for Carnations, Roses, and Lilies.
Messrs. R. Smith, for Clematis.

Silver Flora Medal.

Hon. V. Gibbs (gr., E. Beckett), for Streptocarpus.
Wickham Noakes, Esq. (gr., W. Howarth), for Calceolarias.
Mr. Hayward Mathias, for Carnations.
Mr. C. W. Breadmore, for Sweet Peas and Carnations.
Mr. W. Chaplin, for Sweet Peas.
Messrs. G. & A. Clark, for alpines, Sweet Peas, and hardy flowers.
Messrs. J. Cypher, for Orchids and greenhouse plants.
Messrs. Dobbie, for Aquilegias, Violas, and Sweet Peas.
Mr. C. Engelmann, for Carnations.
Mr. J. Green, for Carnations.
Mr. H. Hemsley, for alpines and rock plants.
Messrs. Hogg & Robertson, for Darwin and cottage Tulips.
The Misses Hopkins, for herbaceous and alpine plants.
Messrs. H. J. Jones, for Sweet Peas and Zonal Pelargoniums.
Messrs. E. W. King, for Sweet Peas.
Messrs. B. Ladhams, for hardy flowers.
Mr. W. H. Lancashire, for Carnations.
Mr. J. Piper, for trained Box trees.
Mr. G. Prince, for Roses.
Mr. A. R. Upton, for herbaceous, alpine, and rock plants.

Silver Banksian Medal.

H. Vivian Phillipps, Esq. (gr., Mr. T. Hobbs), Calceolarias.
Mr. William Artindale, for alpines.
Mr. Clarence Elliott, for miniature rock garden.
Mr. H. N. Ellison, for ferns.
Messrs. Gunn, for hardy herbaceous.
The King's Acre Nurseries, for alpines and herbaceous plants.
Mr. F. Lilley, for Gladioli and bulbous plants.
Messrs. G. Mallett, for rock and herbaceous plants.
Mr. W. H. Page, for Carnations and Roses.
Messrs. Stanley, for Orchids.
Messrs. Storrie, for Auriculas and Polyanthus.

GENERAL MEETING.

June 8, 1909.

Sir John T. Dillwyn-Llewelyn, Bart., V.M.H., in the Chair.

Fellows elected (54).—Mrs. Lockett Agnew, Mrs. Astbury, H. Kendra Baker, Miss Banbury, P. C. Bates, Mrs. Reginald Batt, H. R. Beeton, Hon. Mrs. Bellew, A. F. Blades, Mrs. Reginald Boden, H. Bonny, A. W. Bradley, Mrs. A. F. G. Brown, Col. C. T. Caldecott, W. Oswald Carver, Mrs. Chadbourne, Mrs. E. R. Cook, Hon. Mrs. Crichton, Mrs. Dalgety, H. C. N. Daniell, T. M. Davies, B. G. Elliott, Mrs. L. Fawell, Mrs. E. Fellows, Capt. C. R. K. Fergusson, F. Fisher, L. Forestier-Walker, J.P., R. Forster, Miss C. Gradwell, Mrs. Hamilton, Mrs. E. Hardy, Mrs.

Johnston, H. Higgins, Mrs. D. T. Hine, T. S. Hockey, C. Hutchings, H. Johnson, Mrs. Kennedy, Claude Leatham, D.L., Rev. C. H. D. Lighton, Mrs. Lloyd, James Mitchell, Mrs. D. Elkin Mocatta, Miss Mynors, D. Nicholson, Lady Penrhyn, G. Pyman, Miss Ritchie, C. V. Sale, E. Sebag Montefiore, H. Stilwell, Mrs. Stroulger, E. Townson, Miss Turing, Major P. J. Waldron.

Fellows resident abroad (2).—J. B. Carruthers, F.L.S., F.R.S.E. (West Indies), Wm. Warnaar (Holland).

A lecture on "Some Old Superstitions about Trees and Herbs," was given by the Rev. Prof. G. Henslow, F.L.S., V.M.H. (see p. 183).

GENERAL MEETING.

June 22, 1909.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., in the Chair.

Fellows elected (107).—G. Adams, P. L. Agnew, Miss J. D. S. Aldworth, Miss E. Allcroft, Capt. Hon. H. T. Allsopp, Mrs. H. Arkwright, Alfred Barker, G. Bartholomew, Mrs. D. Bartholomew, Mrs. Berendt, Hon. Mrs. Edward Bethell, G. W. Booth, Miss E. H. Bramwell, Mrs. Byrne, Col. Campbell-Walker, W. H. Carter, Miss G. M. C. Cass, John Chapman, R. J. Clemow, J. Monro Coats, A. H. Cole, Mrs. Corbould-Ellis, Mrs. Cornwallis, Mrs. Alfred Cox, Mrs. S. B. Cripps, Baroness de Goldsmid da Palmeira, Mrs. Charles de Pass, Lady Agnes de Trafford, Mrs. Colin Docwra, A. C. Dreirmann, Mrs. Anstruther Duncan, Miss A. L. Durham, Miss M. Fielden, Mrs. Granville C. Fielden, Miss L. Finch, Miss C. L. H. Fenwick, Lady FitzWygram, Mrs. Guy Flower, A. S. D. Francis, Mrs. W. Garstle, W. D. B. Geldart, S. Dalip Singh Gill, C. R. Gilliat, Miss O. N. Gould, Lady Green, Mrs. G. I. Green, A. W. Hall, John Hancke, S. Hardy, Mrs. Marcus Hare, F. L. Harlock, Ernest J. Harris, J. H. Hawthorn, Bryan T. Holland, Miss F. Howell, Commander P. E. M. Humphery, Mrs. W. H. Hunt, Mrs. Alfred Illingworth, V. L. Jefferies, Miss V. M. Kemble, A. Dyson Laurie, Edward Ledger, Henry H. Lee, Hon. Lady Leigh, Hon. Gerald W. Liddell, Mrs. Loftus, Charles E. Lowndes, Mrs. W. Lund, Mrs. S. R. Lysaght, M. C. Mackenzie, Miss J. Macneill, C. C. Mann, Miss J. C. Monninger, Lady Newnes, Wilson Noble, Miss A. Osborne, O. Owen, J. H. Pavitt, H. Pearson, J. Doyle Penrose, Edward Pettit, Mrs. John Phillips, Viscountess Portman, Gurney Preston, Miss M. Puller, F. E. Rapp, Mrs. Freeman Roper, Mrs. Rumsey, W. J. Saunders, Maj.-Gen. D. A. Scott, C.V.O., C.B., D.S.O., R.E., Mrs. Scott-Elliot, Herbert E. Smith, J. Smith, Mrs. Evelyn Snagge, P. Soderberg, Miss R. Swainson, Mrs. John Swire, Miss C. C. Thornhill, Miss Booth Turner, G. H. Waddilove, John Walker, Miss C. Walter, J. R. N. Waters, F. R. Widdows, F. Wilkinson, C. F. Wood, Henry Wotton.

Fellows resident abroad (5).—B. Chattopadhyay, B.A. (India), Lieut.-Col. W. H. N. Glossop (Canada), H. Hartman (Denmark), S. Jamaluddin (India), F. Hutton Seed (East Africa).

Associates (2).—J. Lingwood, J. Millar.

The first Masters Memorial lecture on "Masters' Vegetable Teratology" was given by Professor Hugo de Vries (see p. 154).

DEPUTATION TO THE GLOUCESTER FLOWER SHOW.

June 23, 1909.

A deputation, consisting of Sir Trevor Lawrence, Bart., K.C.V.O., President of the Society, the Hon. John Boscawen, member of Council, Mr. E. A. Bowles, M.A., F.L.S., member of Council and Vice-Chairman of the Scientific Committee, Mr. H. B. May, member of Council, and the Rev. W. Wilks, M.A., Secretary of the Society, visited Gloucester by invitation of the local committee for the Great Flower Show held there on June 23 in connection with the meeting of the Royal Agricultural Society. The deputation was most hospitably entertained at Westonbirt, the country house of Colonel Holford, C.I.E., C.V.O., but unfortunately the Colonel was confined to his room by the doctor's strict orders. However, the host's place was taken by his cousin, who did everything that was possible to fill his chief's place, and made every member of the deputation feel that nothing whatever was lacking in the welcome save the actual presence of the Colonel. Westonbirt is some miles from Gloucester, so the deputation had a delightful motor run through glorious country scenery, arriving at the Show at 10.30 a.m. The ancient city was gay in every part with a lavish display of bunting and garlands of many coloured flowers and foliage, for His Majesty the King was expected, and Gloucester and the country for miles round was agog, and every vehicle whose wheels would hold together, and every four-footed beast that could be called a horse, had been pressed into service to convey parties of loyal folk eager to see and to acclaim their King. On his arrival His Majesty first visited the Agricultural Departments, but after luncheon—to which our President, Sir Trevor Lawrence, had the honour of being invited—the King went all round the horticultural tents, escorted by the Earl of Ducie (an ardent gardener), Sir William Thiselton-Dyer (to whose exertions the Horticultural Department was very largely indebted), Sir Trevor and the rest of the deputation, and others. The deputation was most hospitably entertained at luncheon by the Mayoress of the ancient city, and greatly regretted that the distance to travel through narrow country lanes at night prevented them from being able to accept an invitation to dinner in the evening with his worship the Mayor. After another delightful motor run the deputation reached Westonbirt again about 6 p.m. The next day the morning was spent in visiting Colonel Holford's glorious garden of trees and shrubs besides the orchids and Hippeastrums, &c., for which Westonbirt is so justly famous, and the return to London occupied the afternoon.

AWARDS MADE AT GLOUCESTER.

The Lawrence Gold Medal.

Colonel Holford, C.I.E., C.V.O., for Orchids.

Gold Medal.

Messrs. Blackmore & Langdon, for Begonias.
Colonel Holford, C.I.E., C.V.O., for Hippeastrums.

Messrs. Cypher, for a group of greenhouse plants arranged for effect.
Messrs. Cypher, for Orchids and hardwooded plants.

Silver Cup.

Hon. Vicary Gibbs (gr. Mr. Beckett, V.M.H.), for vegetables.
Messrs. Heath, for Pelargoniums and alpine garden.
Sir John Dorington, Bart. (gr. Mr. Savegar), for a group of plants.
J. G. Blacker, Esq. (gr. Mr. Curtis), for a group arranged for effect.
Sir Randolph Baker, Bart., (gr. Mr. Usher), for Sweet Peas.

Silver-gilt Flora Medal.

Messrs. Stuart Low, orchids, Carnations, &c.
Mr. W. A. Holmes, for a group arranged for effect.

Silver Gilt Banksian Medal.

King's Acre Nursery, for Roses and Fruit.
Mr. Godfrey, for Pelargoniums and Oriental poppies.
Messrs. Cutbush, for Carnations, &c.
Mr. J. S. Sharp, for a group of plants.
Mr. W. Vause, for a group of plants.
Mr. Breadmore, for Sweet Peas.
Messrs. Dobbie, for Sweet Peas, &c.
Mr. Geo. Mount, for Roses.

Silver Knightian Medal.

Messrs. Laxton, for Strawberries.
Messrs. Sutton, for illustration of intensive gardening.

Silver Flora Medal.

Messrs. Dicksons, Chester, for hardy flowers.
Messrs. Jefferies, for Carnations and Shrubs.
Messrs. Bakers, for herbaceous plants.
Hugh Andrews, Esq. (gr. Mr. Tooley), for Carnations and Eremurus.
Mr. C. F. Waters, for Carnations.
Mr. M. Prichard, for hardy plants.
Mr. E. J. Hicks, Roses.
Messrs. Bath, hardy flowers.

Silver Banksian Medal.

Mr. H. N. Ellison, for Ferns.
Messrs. Gunn, for hardy flowers.
Messrs. Dickson (Newtownards), for New Roses.
Messrs. White, for herbaceous plants.
Miss Hemus, for Sweet Peas.
Messrs. Toogood, for Sweet Peas.
Mr. T. W. Darlington, for Sweet Peas.
Messrs. W. & J. Brown, for hardy flowers.
Messrs. Bell & Sheldon, for Carnations.
Mr. A. F. Dutton, for Carnations.

Messrs. Harkness, for hardy plants.
Mr. A. A. Walters, for Roses.

First-class Certificate.

To *Cattleya Mossiae* 'Countess Grey,' votes, unanimous, from Colonel Holford, C.I.E., C.V.O., Westonbirt (gr. Mr. Alexander).

A most charming flower of the typical *C. Mossiae* class with enormous magenta-rose blooms, with large violet-marbled lip.

HOLLAND PARK SHOW.

JULY 6 AND 7, 1909.

JUDGES.

ORCHIDS.

Chapman, H. J.
Fowler, J. Gurney
Little, H.
Wellesley, F.

ROSES.

May, H. B.
Mease, W.
Philbrick, Miss
Willmott, Miss, V.M.H.

CARNATIONS.

Blick, Chas.
Douglas, James, V.M.H.
Jennings, J.
Turner, Arthur

FRUIT AND VEGETABLES.

Challis, T., V.M.H.
McIndoe, J., V.M.H.
Pearson, A. H.
Poupart, W.
Rollit, Sir Albert

GROUPS IN OPEN.

Beckett, E., V.M.H.
Chapman, A.
Thomas Owen, V.M.H.
Wythes, Geo., V.M.H.

HARDY HERBACEOUS PLANTS.

Bedford A.
Bowles, E. A.
Grandfield, J.
Shea, C. E.

ALPINE AND ROCK PLANTS.

Bilney, W. A.
Boscawen, Rev. A.
Divers, W. H.
Lynch, R. Irwin

FOLIAGE PLANTS.

Bain, W.
Fielder, C. R.
Hudson, James, V.M.H.
McLeod, Jas.

FLOWERING PLANTS.

Bates, W.
Coomber, T.
Howe, W.
Reynolds, Geo.

PLANTS NOT INCLUDED IN ABOVE.

Dixon, C.
Notcutt, R. C.
Turner, T. W.

IMPLEMENTS AND SUNDRIES.

Davis, J.
Gibson, J.
Nix, C. G. A.
Parr, H.
Pearson, C. E.
Ware, W. T.

AWARDS GIVEN BY THE COUNCIL AFTER CONSULTATION WITH THE JUDGES.

The order in which the names are entered under the several medals and cups has no reference whatever to merit but is purely accidental.

The awards given on the recommendation of the Floral and Orchid Committees will be found in their respective reports.

Gold Medal.

Lord Llangattock, for Pineapples and Strawberries.
Hon. Vicary Gibbs, for vegetables.
F. Menteith Ogilvie, Esq., for Orchids.
Messrs. G. Bunyard, for fruit trees.
Messrs. J. Carter, for a Japanese garden.
Messrs. Charlesworth, for Orchids.
Messrs. W. Cutbush, for Carnations, hardy plants, and clipped trees.
Messrs. H. B. May, for stove and greenhouse plants.
Messrs. W. Paul, for Roses.
Mr. Amos Perry, for rock and water garden, hardy ferns, &c.
Mr. M. Prichard, for hardy herbaceous plants.
Messrs. Sander, for Orchids.
Messrs. Sutton, for Sweet Peas and Culinary Peas.
Messrs. J. Veitch, for stove plants, Orchids, Carnations, &c.
Messrs. R. Wallace, for herbaceous border and water garden.

Silver Cup.

Sir Jeremiah Colman, Bart., for Orchids.
Sir Randolf Baker, Bart., for Sweet Peas.
J. Friedlander, Esq., for Fuchsias.
S. Heilbut, Esq., for Cherries in pots.
Lieut.-Colonel C. Heseltine, for Sweet Peas and Roses.
E. J. Johnstone, Esq., for Carnations and Sweet Peas.
Messrs. W. Artindale, for Violas and hardy plants.
Messrs. Barr, for Japanese trees and hardy plants.
Messrs. Blackmore & Langdon, for Begonias and Delphiniums.
Messrs. Clark, for hardy flowers.
Messrs. W. Fromow, for Japanese maples and shrubs.
Messrs. Hobbies, for Roses.
Messrs. E. W. King, for Sweet Peas.
Messrs. Stuart Low, for Orchids, Carnations, Roses, &c.
Messrs. H. B. May, for ferns.
Mr. R. C. Notcutt, for hardy herbaceous plants.
Mr. W. H. Page, for Lilies, Carnations, and Spiræas.
Messrs. Paul & Son, for Roses and Pæonies.
Mr. G. Reuthe, for alpines and hardy flowers.
Mr. L. R. Russell, for ivies and foliage plants.
Messrs. J. Veitch, for Sweet Peas, Gloxinias, and hardy flowers, &c.
Messrs. T. S. Ware, for Begonias, Carnations, and hardy plants.
Messrs. E. Webb, for Sweet Peas and vegetables.

Silver-gilt Flora Medal.

Miss M. W. Anson, for Orchid paintings.
Mr. C. W. Breadmore, for Sweet Peas and Carnations.
Messrs. W. Bull, for foliage plants.
Messrs. Bell & Sheldon, for Carnations.
Messrs. G. Bunyard, for fruit trees and hardy flowers.
Messrs. H. Cannell, for Cannas and Fuchsias.
Messrs Frank Cant, for Roses.
Messrs. J. Carter, for Sweet Peas.
Messrs. J. Cheal, for trees, shrubs, and hardy plants.
Messrs. A. Dickson, for New Roses.
Mr. A. F. Dutton, for Carnations.
Mr. A. Ll. Gwillim, for Begonias.
Messrs. G. Jackman, for herbaceous plants.
Mr. B. Ladhams, for hardy flowers.
Mr. G. Lange, for Carnations.
Mr. Frank Lilley, for Gladioli.
Messrs. J. W. Moore, for Orchids.
Mr. C. Turner, for Roses and Carnations.
Mr. W. J. Unwin, for Sweet Peas.
Mr. C. F. Waters, for Carnations.

Silver-gilt Knightian Medal.

Messrs. Laxton, for Strawberries.
Mr. W. Poupart, for bottled fruits.

Silver Knightian Medal.

Swanley Hort. College, for fruit and vegetables.

Silver-gilt Banksian Medal.

Messrs. B. R. Cant, for Roses.
Messrs. Carter Page, for Sweet Peas.
Miss Hemus, for Sweet Peas.
Messrs. Kelway, for Sweet Peas and hardy flowers.
Mr. Geo. Prince, for Roses.
Messrs. Stark, for Sweet Peas.

Silver Flora Medal.

J. Rutherford, Esq., for Orchids.
American Carnation Nursery, for Carnations.
Messrs. R. H. Bath, for Carnations, Roses, and hardy flowers.
Messrs. Bees, for Primulas, &c.
Mr. C. Blick, for Carnations.
Mr. W. R. Chaplin, for Roses and Sweet Peas.
Mr. Clarence Eliott, for alpines.
Messrs. John Forbes, for Phloxes, Pentstemons, and Pansies.
Guildford Hardy Plant Nursery, for hardy plants.
Messrs. Gunn, for hardy plants.
Mr. H. Hemsley, for rock garden, ferns, &c.
King's Acre Nurseries, for Roses.

Mr. E. V. Low, for Orchids.
Messrs. J. Peed, for Carnations and Caladiums.
Messrs. D. Russell, for hardy trees and shrubs.

Silver Banksian Medal.

Mr. H. H. Crane, for Violas.
Mr. W. J. Godfrey, for *Solanum Wendlandii.*
Messrs. Harkness, for Roses.
Misses Hopkins, for rock and alpine plants.
Mr. W. Iceton, for Lilies-of-the-Valley.
Messrs. J. K. King, for Sweet Peas.
Messrs. G. Mallett, for hardy flowers.
Messrs. Merryweather, for Roses.
Mrs. Miller, for Chutney and Orange Jelly.
Messrs. J. Piper, for trained box and yew trees.
Messrs. W. Seagrave, for Violas.
Messrs. J. Waterer, for *Kalmia latifolia.*
Messrs. Whitelegg & Page, for hardy flowers.

HORTICULTURAL SUNDRIES.

Silver-gilt Flora Medal.

Mr. G. W. Riley, for summerhouses and garden furniture.
Messrs. W. Wood, for summerhouses, manures, peat, loam, sand, &c.

Silver-gilt Banksian Medal.

Lamp Pump Syndicate, for lamp pump (Badcock's Patent).

Silver Flora Medal.

Messrs. Buswell, for garden seats, tents, &c.
Messrs. Castles, for teak wood garden furniture.
Messrs. Thos. Green, for lawn mowers.
Messrs. Liberty, for garden pottery.
Potters Art Guild, for terra cotta garden vases, seats, &c.
Messrs. Ransomes, Sims, & Jefferies, for lawn mowers.

Silver Banksian Medal.

Four Oaks Syringe Co., for syringes, spraying machines, &c.
Mr. S. Pradal, for wire-bound patent tubs for shrubs.
Messrs. A. Shanks, for lawn mowers.
Messrs. W. Voss, for fertilizers, insecticides, and sundries.

Bronze Flora Medal.

Messrs. Doulton, for garden ornaments, vases, and sundials.
Messrs. Lloyd Lawrence, for "Pennsylvania" lawn mowers.
Messrs. H. Scott, for garden furniture and sundries.

Bronze Banksian Medal.

Messrs. W Duncan Tucker, for greenhouse frames, &c.
Messrs. Headly & Edwards, for garden seats, chairs, &c.

GENERAL MEETING.

July 20, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair.

Fellows elected (47).—James Allan, Hon. Mrs. Alington, A. E. Akhurst, Mrs. A. Conyers Baker, Dr. F. A. Barton, Mrs. R. Baily, Rudolf Beer, Noel Berridge, H. J. Selborne Boome, Mrs. D. Briggs, Mrs. F. Carter, F. J. M. Christie, Clive Cookson, Mrs. E. M. Crookshank, Miss M. E. Cross, A. J. Elkington, James Gibb, W. Graysmark, Mrs. Greenaway, E. H. Hargreaves, J. C. Hollocombe, Hon. A. Nelson Hood, Mrs. R. Hooper, B. L. Jenkinson, Cecil H. Lepine, Mrs. James Martin, G. W. Neville, Miss H. Paine, E. T. Parker, Miss E. Pengelley, Mrs. T. J. Perry, Norman A. Phillips, R. Potter, Mrs. C. Westcombe Pumphrey, Mrs. W. G. Rawlinson, Noël W. Richardson, Leo. F. Schuster, Charles Scott, David Seth-Smith, A. F. Stewart, Mrs. Sudbury, Mrs. Stuart Trotter, Ferdinand H. Wallis, Lieut.-Col. A. S. Wedderburn, Julius Weil, Charles Willis, Mrs. Hy. Wolryche-Whitmore.

Fellows resident abroad (3).—Frank Brunton (U.S.A.), R. Galbraith (South Africa), David Tannock (New Zealand).

Society affiliated (1).—Bush Hill Park Horticultural and Allotment Holders' Association.

A lecture on "Mendelism and Barley" was given by Professor R. H. Biffen, M.A.

DEPUTATION TO CARDIFF.

July 22, 1909.

On the occasion of their twenty-first anniversary the Committee of the Cardiff and County Horticultural Society invited a deputation of the R.H.S. to visit their Show, and the following members of Council were deputed to attend, viz., Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., President of the Society; Mr. Harry J. Veitch, V.M.H.; Mr. H. B. May, Mr. James Hudson, V.M.H.; and the Rev. W. Wilks, M.A., Secretary of the Society.

The deputation was most warmly welcomed on their arrival, and were entertained at dinner on the evening of the 22nd, under the chairmanship of Lord Ninian Crichton-Stuart, at the Angel Hotel.

On Wednesday, July 22, at 7.15 a.m., in pouring rain, the members of the deputation were most kindly taken for a motor drive by Mr. Councillor Curtis and Mr. Bruckewitch to see the country round Cardiff, and visited Llandaff and Castle Koch and inspected the exterior of the magnificent Cardiff Municipal Buildings. After breakfast the Show was visited, and greatly pleased the deputation was with it, notwithstanding the most unfortunate weather; and at 1.30 the deputation were the guests of the Most Noble the Marquis of Bute, who entertained them at luncheon, together with the Judges and Committee and many of the leading citizens of Cardiff. Later in the day the deputation left for London, having greatly enjoyed their glance at Welsh horticulture and their experience of Welsh hospitality.

AWARDS MADE AT CARDIFF.

Gold Medal.

Marquis of Bute, for fruit.
Mr. W. Treseder, for hardy plants.
Messrs. Jas. Veitch, for stove plants.

Silver Cup.

Marquis of Bute, for stove and greenhouse plants.

Silver-gilt Flora Medal.

Lady Hill, for a group.
Messrs. Cypher, for a group.
Messrs. Wallace, for rock garden.
Messrs. Blackmore & Langdon, for Begonias.

Silver-gilt Banksian Medal.

Messrs. Gibson, Bedale, for hardy flowers.
Mr. T. Jones, Ruabon, for Sweet Peas.
Mr. Fred. Eames, Frome, for hardy herbaceous plants.

Silver Flora Medal.

Mr. J. Mattock, Oxford, for Roses.
Messrs. Dicksons, Chester, for hardy plants.
Messrs. Dobbie, Rothesay, for Sweet Peas.
Mr. C. F. Waters, Balcombe, for Carnations.
Mr. C. W. Breadmore, Winchester, for Sweet Peas.
J. J. Neale, Esq., J.P., for insectivorous plants and Orchids.
Mr. H. Eckford, Wem, for Sweet Peas.
Mr. L. R. Russell, Richmond, for shrubs.

Silver Knightian Medal.

King's Acre Nurseries, for fruit trees in pots.

Silver Banksian Medal.

Messrs. Evans, Llanishen, for a rock garden and hardy plants.
Mr. J. Crossling, Penarth, for Roses.
Messrs. Bell & Sheldon, Guernsey, for Carnations.
Mr. R. Went, Llandaff, for hardy flowers.
Mr. H. N. Ellison, West Bromwich, for Ferns.
Mr. E. E. Hole, Barry Dock, for vegetables.

Bronze Banksian Medal.

Mr. W. J. Mellings, for Plumbago.
Walter Mellings, for wild flowers.
Lovina Duffield, for wild flowers.
Clifford Mellings, for Fuchsia.
Beatie Webber, for bouquet of named wild flowers.

Cultural Commendation.

Messrs. J. Veitch, for *Nepenthes* 'Sir William Thiselton-Dyer.'

GENERAL MEETING.

August 3, 1909.

Mr. James Hudson, V.M.H., in the Chair.

Fellows elected (28).—The Countess of Albemarle, Mrs. Brooksbank, Miss Chads, D. F. Charrington, Lady Mildred Cooke, W. Dobson, Mrs. Finlay, W. W. Frost, Miss Gilbert, Mrs. Hargreaves, P. J. Hart, F. F. Hodds, J. R. Jackson, Mrs. Keswick, J. Lyon, F. Mayo, Mrs. Orr-Wilson, Mrs Prestige, Col. F. C. W. Rideout, J. Roper, Mrs. R. H. Selbie, T. A. Stroud, Mrs. Tempest, F. R. Todd, C. R. Vickers, Mrs. Wallis, T. Wilson, E. Wood.

Fellows resident abroad (2).—S. S. Ahmad (India), A. D. Khan (India).

A lecture on "Water Plants" was given by Mr. Fred. W. Moore, A.L.S., V.M.H. (see p. 188).

GENERAL MEETING.

August 17, 1909.

Sir Albert K. Rollit, D.L., in the Chair.

Fellows elected (10).—Mrs. Brett, Mrs. Brookhouse, H. R. Bryant, Mrs. Connett, L. D. Dredge, Mrs. Alfred Fowler, Norman Fox, Mrs. Harman, W. Montague, A. V. Squire.

Fellows resident abroad (2).—P. D. Cravath (U.S.A.), A. C. Hodenpyl, (U.S.A).

A lecture on "Bees in Relation to Gardening" was given by Mr. Walter F. Reid, F.I.C., F.C.S. (see p. 195).

GENERAL MEETING.

August 31, 1909.

Mr. J. Cheal, F.R.H.S., in the Chair.

Fellows elected (8).—H. F. Buckingham, J. O. Callender, Mrs. E. G. Cooke, Wilfrid Oats, Mrs. J. B. Ponsford, Miss Sparks, Arthur Trower, Miss Ruth Tustin.

Societies affiliated (2).—Amersham Fête Committee, Geraldine Horticultural Association.

A lecture on "The Gardens by the Lake of Como" was given by Mr. James Hudson, V.M.H. (see p. 204).

SPECIAL CLASSES AT THE EXHIBITIONS IN 1909.

[THE FRUIT AND VEGETABLE COMPETITIONS ARE HELD IN PLACE OF THE GREAT AUTUMN SHOW.]

TUESDAY, MAY 4.

Class **3.**—Strawberries, 3 varieties shown in boxes as packed for transit: not more than 36 or less than 20 Fruits of each variety. Amateurs.

First Prize, £1; Second, 15*s.*

No entries.

Class **4.**—Box of 1 variety of Strawberries. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Lord Foley, Ruxley Lodge, Claygate, Surrey (gr., H. C. Gardner).
2. Lord Howard de Walden, Audley End, Saffron Walden (gr. J. Vert).

Class **5.**—Three varieties of Strawberries. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

1. Messrs. J. & F. Chatfield, Southwick, Sussex.

No Second.

Class **6.**—Melons, 3 Fruits. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

No entries.

Class **7.**—Melons, 6 Fruits. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **8.**—Figs, 2 Dishes, distinct. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

No entries.

TUESDAY, MAY 18.

Class **3.**—Vegetables, 9 kinds, forced or not. Amateurs.

First Prize, £3; Second, £2.

1. Hon. Vicary Gibbs, Aldenham House, Elstree, Herts (gr., E. Beckett).
2. Countess Cowper, Panshanger, Hertfordshire (gr., R. Stanard).

Class **4.**—Vegetables, 6 kinds. Amateurs.

First Prize, £2; Second, £1 10*s.*

No entries.

Class **5.**—Vegetables, 4 kinds. Amateurs.

First Prize, £1 10*s.*; Second, £1.

1. Not awarded.
2. A. G. Gentle, Esq., Little Gaddesden, Berkhamsted.

Class **6.**—Vegetables and Salads occupying a space 10ft. × 3ft. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Tuesday, June 8.

Class **3.**—Collection of Fruit, 6 kinds. Black and White Grapes count as distinct kinds. Amateurs.

First Prize, £3; Second, £2.

1. Not awarded.
2. E. S. Hanbury, Esq., Poles Park, Ware, Herts (gr., F. W Church).

Class **4.**—Collection of Fruit, 6 kinds. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **5.**—3 Bunches of one Black Grape. Amateurs.

First Prize, 30*s.*; Second, £1.

No entries.

Class **6.**—3 Bunches of 1 White Grape. Amateurs.

First Prize, 30*s.*; Second, £1.

No entries.

Class **7.**—Basket of Grapes, about 10 lb. in weight. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Tuesday, June 22.

Class **3.**—Tomatos, 3 dishes, distinct. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

1. Hon. Vicary Gibbs.
2. Lord Foley.
3. Lord Howard de Walden.

Class **4.**—Tomatos, 1 dish. Amateurs.

First Prize, 7*s.* 6*d.*; Second, 5*s.*

No entries.

Class **5.**—Tomatos, 6 dishes, distinct. Trade Growers.

First Prize, Silver-gilt Banksian Medal; Second, Silver Banksian Medal.

No entries.

Class **6.**—Peas, 6 dishes, distinct. Amateurs.

First Prize, £1; Second, 15*s.*

No entries.

Class **7.**—Peas, 3 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

No entries.

Class **8.**—Peas, 12 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY AND WEDNESDAY, JULY 6 AND 7, 1909.

HOLLAND PARK SHOW.

See also page ci.

Class **3.**—Cherries, 3 dishes, distinct. 50 to 60 fruits of each shown in boxes as packed for transit. Amateurs.

First Prize, £1; Second, 15*s.*

1. Lord Howard de Walden.

Class **4.**—Strawberries, 3 dishes, distinct. 20 to 36 fruits of each shown in boxes as packed for transit. Amateurs.

First Prize, £1; Second, 15*s.*

1. Lord Howard de Walden.

Class **5.**—Peaches, 1 dish of one variety. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Viscount Enfield, Wrotham Park, Barnet (gr., H. Markham).

Class **6.**—Nectarines, 1 dish of one variety. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

No entries.

Class **7.**—Melons, 3 fruits. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

No entries.

Class **8.** Fruit Trees in pots, 18 Trees, not less than 3 kinds. Trade Growers.

First Prize, Hogg Medal; Second, Knightian Medal.

No entries.

Class **9.**—Ripe Fruit. A collection to occupy a space 12ft. × 3ft. Trade Growers.

First Prize, Silver-gilt Knightian Medal; Second, Silver Knightian Medal.

No entries.

TUESDAY, JULY 20.

Class **3.**—Strawberries, 3 dishes, distinct: 20 to 36 fruits of each, in boxes for transit. Amateurs.

First Prize, £1; Second, 15*s.*

No entries.

Class **4.**—Cherries, 2 dishes, distinct; 50 to 60 fruits of each, in boxes for transit. Amateurs.

First Prize, 12*s.*; Second, 8*s.*

1. Mrs. English, Addington Park, Croydon (gr., J. R. Smith).

Class **5.**—Currants, 3 dishes, red, white, black. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

1. E. J. Preston, Esq., Kelsey Park, Beckenham (gr., M. Webster).

Class **6.**—Collection of Strawberries, Raspberries, Cherries, and Currants, in a space 9 ft. × 3 ft. Trade Growers.

First Prize, Silver-gilt Banksian Medal; Second, Silver Knightian Medal.

No entries.

TUESDAY, AUGUST 3.

Class **3.**—Melons, 3 Fruits. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

No entries.

Class **4.**—Gooseberries, 6 dishes, distinct. Amateurs.

First Prize, £1; Second, 15*s.*

1. E. J. Preston, Esq.

Class **5.**—Gooseberries, 18 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal. Second, Silver Banksian Medal.

1. Messrs. J. Salsbury, The Shaw, Melbourne, Derby.

TUESDAY, AUGUST 17.

Class **3.**—Potatos, early varieties, 6 dishes, distinct. Amateurs.

First Prize, £1; Second, 15*s.*

1. A. G. Gentle, Esq.
2. Countess Cowper.

Class **4.**—Potatos, early varieties, 3 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. C. Coombe, Esq., Cobham Park, Cobham, Surrey (gr., A. Tidy).
2. Rev. L. C. Chalmers-Hunt, Willian Rectory, Hitchin, Herts.

Class **5a.**—Beans, French or Kidney. Dwarf, 3 dishes distinct. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Countess Cowper.
2. Rev. L. C. Chalmers-Hunt.

Class **5b.**—Beans, Climbing, 3 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 7*s* 6*d.*

1. Rev. L. C. Chalmers-Hunt.

Class **6a.**—Beans, Dwarf, 6 dishes, distinct. Trade Growers.

No entries.

Class **6b.**—Beans, Climbing, 6 dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal.} In both
Second, Silver Banksian Medal. } **a** and **b**
No entries.

TUESDAY, AUGUST 31.

Class **3.**—Peaches, 4 dishes, distinct. Amateurs.
First Prize, £1 10*s.*; Second, £1.
No entries.

Class **4.**—Peaches, 2 dishes, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. E. Mocatta, Esq., Woburn Place, Addlestone, Surrey (gr., T. Stevenson).

Class **5.**—Nectarines, 4 dishes, distinct. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. E. Mocatta, Esq.

Class **6.**—Nectarines, 2 dishes, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*
No entries.

Class **7.**—Plums, 6 dishes, distinct. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. Lord Howard de Walden.
2. C. H. Coombe, Esq.

Class **8.**—Plums, 3 dishes, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. Viscount Enfield.

Class **9.**—Collection of Peaches, Nectarines, and Plums, collection in a space of 9ft. × 3ft. Trade Growers.
First Prize, Silver-gilt Banksian Medal; Second, Silver Knightian Medal.
No entries.

SCIENTIFIC COMMITTEE.

May 4, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, with sixteen members present and W. E. Ledger, visitor.

Hybrid Narcissus.—Mr. Douglas, V.M.H., showed specimens of a hybrid *Narcissus* obtained by crossing *N. calathinus* (which is not quite hardy) with the *bicolor* trumpet daffodil 'Weardale Perfection.' The hybrid was a white trumpet daffodil with a somewhat short trumpet. It has proved hardy.

Variations in Primroses.—Mr. Douglas commented upon the considerable variations often seen in cultivated primroses in the comparative length of the style and the positions of the stamens, and showed specimens to illustrate his remarks. Extreme examples of departure from the normal conditions were seen in a flower in which the anthers and the stigma were level at the base of the corolla tube, and in another where the style projected much beyond the mouth of the corolla tube.

Hybrid Salices, &c.—Mr. Fraser, F.L.S., exhibited living and herbarium specimens of the following plants :—

(1) *Salix fragilis* × *triandra* (= *alopecuroides* Zausch.) gynandrous specimens of the tree, which is normally male. Some of the smaller branches bore female catkins with a few stamens amongst them. The ovary is similar to that of *S. fragilis*, and the stigmas recall *S. triandra*. The posterior gland is often changed into one or two ovaries, separate or combined. The stamens are usually three ; in the female catkin there may be one, two, or three ovaries, and sometimes one stamen and one ovary (collateral).

(2) *Salix Myrsinites* × *nigricans* (= *punctata*, Wahlb).

(3) *Salix Arbuscula* × *herbacea* (= *simulatrix*, F. B. White).

Mr. Fraser also exhibited specimens showing sepalody of the petals in wallflower, and pistillody of the stamens in the same flower, and fasciation of the flower stem of *Cardamine pratensis*.

Branching in Tulips.—Mr. Hooper Pearson showed branched stems of tulips of the Darwin form from Mons. Bony, Clermont-Ferrand, France, the varieties representing considerable variety in colour. There were usually four flowers, but sometimes as many as seven from a single bulb. The stems showed some degree of fasciation such as is frequently seen in these tulips. The exhibit was particularly interesting since it was stated that the branching character had become perfectly fixed when the plants were reproduced vegetatively, and that seedlings give a considerable proportion of plants showing the same character. In the case of tulips the branching character cannot be due to the union of several flowers, as is usually the case in fasciation, since normally the tulip is one-flowered. It must, therefore, be due to division of the flower-forming tissue at a very early stage of its development (fig. 83).

Hybrid Orchids.—Mr. Rolfe, A.L.S., showed flowers of *Epidendrum evectum* (purple) and *E. xanthinum* (yellow), and the hybrid raised by crossing them (= *E.* × *kewense* of a salmon colour). He also showed flowers of *E.* × *kewense* crossed with *E. evectum*, producing a hybrid having purple flowers (but not of the same shade as *E. evectum*), and of *E.* × *kewense* crossed with *E. xanthinum*, this cross bearing flowers resembling *E.* × *kewense*. When *E.* × *kewense* was self-pollinated it reproduced flowers of three sorts bearing great resemblance in colour to *E. evectum*, *E.* × *kewense* and *E. xanthinum* respectively.

Various plants.—Mr. G. Paul, V.M.H., sent specimens of the two shrubs *Plagiospermum sinense*, an interesting plant belonging to the *Rosaceae*, with flowers nearly approaching the *Celastraceae* in structure, and bearing thorns a little distance above each of the leaf axils in addition to the usual axillary bud, and *Gleditschia Delavayi*, a species from Yunnan. Both of these have proved hardy at Cheshunt, but Mr. Hales stated that the latter had been killed by frost at Chiswick.

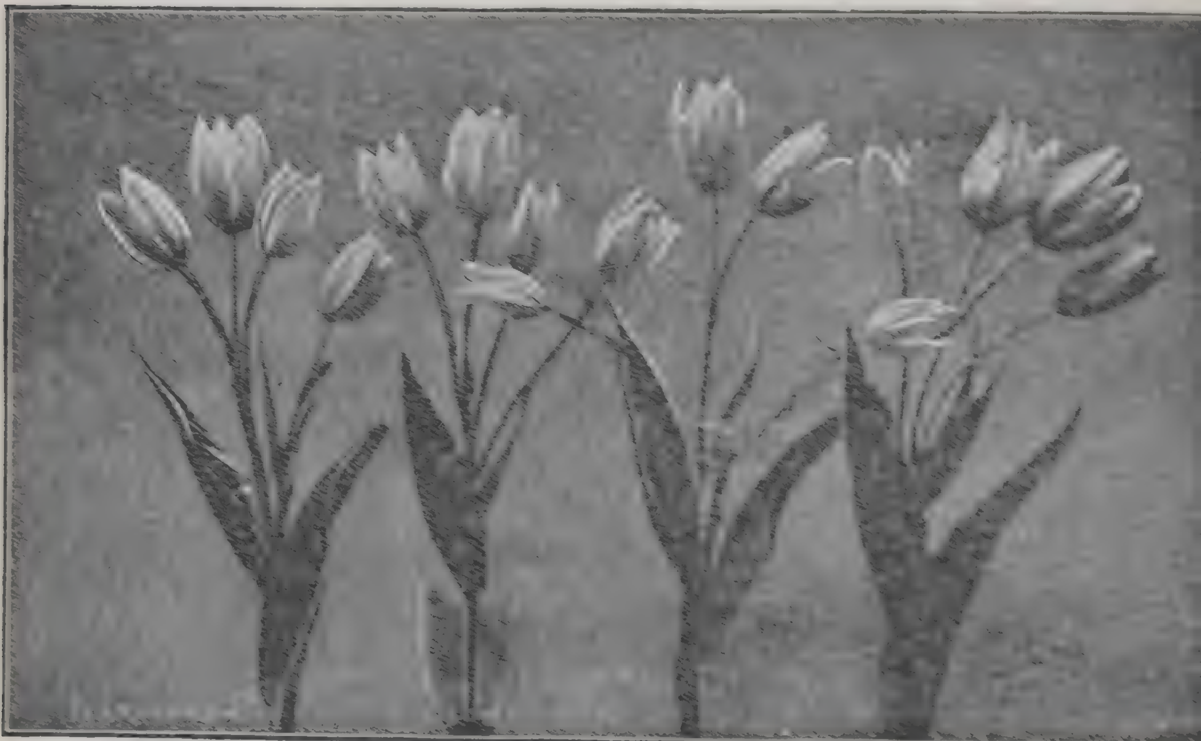


FIG. 83.—BRANCHED TULIPS. [*Gardeners' Chronicle.*] [p. cxiii.]

Mr. Worsley showed an inflorescence of *Oncidium* [illegible] var. *Rogersii* to illustrate the great amount of variation in the lobing of the labellum seen in this plant.

Mr. Elwes, V.M.H., exhibited a number of fine flowers of the recently introduced Regelio-Oncocyclus hybrid irises raised by Mr. van Tubergen. He found that if kept dust dry for about five months they could be successfully grown in this country, and did not die out as the Oncocyclus irises usually do.

SCIENTIFIC COMMITTEE, MAY 18, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, with seventeen members present and E. H. Wilson, visitor.

The Committee heartily welcomed Mr. E. H. Wilson on his return from his journey of botanical exploration in Western China.

Rose with foliar sepals.—Lieut.-Col. Currie, Norwich, sent a specimen of the rose 'Niphetos' having one of the sepals developed into a perfect leaf with five leaflets and stipules well developed. While the peculiarity is not rare, so perfectly developed a specimen as this is seldom met with.

Ranunculus auricomus.—Dr. Rendle, F.R.S., showed specimens of the depauperate form of *R. auricomus* with one or two petals only in some flowers, and in others the petals scarcely developed. This species often has very imperfect flowers.

Salix pentandra.—Mr. Fraser, F.L.S., showed specimens of the flowers of *Salix pentandra* in which the posterior gland had proliferated and given rise to two or three small pistils in addition to the normal one. He pointed out that in the genus *Populus* belonging to the same family as *Salix* there is a perianth, and that Bentham had regarded the gland in *Salix* as homologous with the perianth of *Populus*. He found on examination of the frequent cases of abnormal development of this gland or disc in *Salix pentandra*, considerable grounds for believing Bentham's view to be the correct one. Frequently the gland became so much developed that it grew almost three parts round the pedicel of the ovary.

Viola lutea and V. lutea amoena.—Mr. Fraser also showed specimens of these two Violas collected in meadows at considerable elevations in Scotland. He said that the Scotch raisers of the garden violas had used this species in their formation, and from it had been derived the perennial habit of these varieties. Mr. Cuthbertson corroborated the statement, saying that this had been the case in 1859 and 1860, but he thought that little good would be likely to arise by recrossing the species with the Violas of the present day since they were so generally hardy and perennial. He had planted over 100 varieties in an Essex garden in October 1907, and had found that a very large proportion of them had survived the severity even of the past winter, the varieties 'Royal Sovereign' and 'Bullion' being particularly noticeable in this respect.

Frost injury.—Mr. F. J. Baker showed leaves of peas having white patches upon them, from Cambridgeshire. They seemed to show signs of albinism, but were also injured by frost. It is possible that the latter was connected with former phenomenon, since, as Professor Church pointed out, the albino spots upon a leaf always contain a larger percentage of water than the green parts, and thus are probably more liable to injury by frost than the green parts. There is also always less lime and potash in the white parts of a variegated leaf than in the green.

Primula hybrids.—Mr. H. J. Veitch, V.M.H., showed a series of crosses between *Primula pulverulenta* and *P. Cockburniana.* These are both native of Western China, the former being of a rich purple colour and perennial and the latter orange and apparently biennial. The series was as follows :—

P. pulverulenta ♀ × *P. Cockburniana* ♂ gave *P.* × 'Unique' (cerise), while the reciprocal cross gave *P.* × 'Unique Improved,' differing somewhat in colour from 'Unique,' being somewhat darker, but of similar habit. These hybrids are perennial (fig. 86).

P. Cockburniana ♀ × *P.* × 'Unique' ♂ gave a plant bearing terra-cotta flowers nearly the colour of *P. Cockburniana*, but with the habit of *P. pulverulenta*, to which the foliage bore a great resemblance. This would appear to be perennial, since the plant which flowered last year is again in bud.

P. pulverulenta ♀ × *P.* × 'Unique Improved' ♂ and *P.* × 'Unique' ♀ × *P. pulverulenta* ♂ were almost identical in colour of flowers, just a little brighter than *P. pulverulenta*, while when the plant raised by crossing *P. Cockburniana* and *P.* × 'Unique' was fertilized from that raised by crossing *P.* × 'Unique' and *P. pulverulenta*, the colour of the flower showed a greater variation from *P. pulverulenta*, and was of a warm cerise.

Abnormal Tulip (new seedling variety).—A correspondent sent specimens of abnormal tulips, which were in all respects normal florists' breeders, except that the three inner petals of each possessed a couple of small spurs near the base pointing inwards. The malformation is constant, and recurs each year ; it is found in all the offsets that have arisen from the original seedling, and is evidently characteristic of the variety. Both plants were normal, as were all the other seedlings raised from the same parents. No similar structures in a tulip bloom have fallen under the raiser's observation either among tulip species or some 1,500 other seedlings of florists' tulips. Somewhat similar formations to these are sometimes met with among tulips, but no member of the Committee had before seen specimens where the abnormality was so regularly and symmetrically developed.

Orchid hybrids.—Mr. Gurney Wilson, F.L.S., sent flowers of seedlings of the cross *Dendrobium nobile album* × *D. Findleyanum* (= *D.* × 'Cybele'). All the seedlings which had flowered (about sixty) had borne coloured flowers approaching *D. nobile*, with one exception, where the flowers were white with a faint pink tinge.

Pisum sp., &c.—Mr. A. W. Sutton, V.M.H., showed plants in flower of the wild pea collected in Palestine which he had before exhibited, and of *P. quadratum*, to demonstrate the fact that the two were not identical. The seeds of the two are very similar to one another, but the mature plants differ particularly in the amount of serration of the leaves.

Mr. Sutton also showed the plant of Asparagus which had been collected in the Himalaya, but the Committee desired to see it again when it was in flower.

Impatiens × comoricoma.—Mr. H. J. Veitch, V.M.H., showed on behalf of Messrs. Cayeux & Le Clerc, of Paris, plants of the hybrid *Impatiens* × *comoricoma* raised from *I. comorensis* and *I. auricoma*, the former with rose-coloured flowers, the latter with yellow, those of the hybrid being "rouge chauldron éclairé de jaune soufre, striées de carmin sur les bords intérieux des pétales latéraux." The anterior sepal of *I. comorensis* is white, and of *I. auricoma* yellow, while in the hybrid it is yellow striped in the lower part with carmine. A table comparing the hybrid with its parent is given along with an account of the raising of the hybrid in the *Revue Horticole*, September, 1908, pp. 427-428 (see below).

Uncommon Conifers.—From Sir Edmund Loder, Bart., Leonardslee, came branches with cones of *Larix Griffithii* and *L. americana.*

Scientific Committee, June 8, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair and eighteen members present.

Impatiens × *comoricoma.*—The award of a Certificate of Appreciation was unanimously recommended to Messrs. Cayeux in acknowledgment of work done in raising the hybrid Impatiens shown at the last meeting, and the careful notes thereon contained in the *Revue Horticole.*

Hybrid Dianthus.—Mr. Douglas, V.M.H., exhibited flowers of hybrid *Dianthus.* One had been raised by crossing *Dianthus barbatus* with a double pink (*D. plumarius*). This had rather glaucous foliage, leaves about ¾in. broad, and pink flowers with about a dozen petals laciniated at the margins, borne on branched stems carrying about eight or ten flowers. The second was the hybrid between *D. barbatus* and *D. Caryophyllus* var. 'Uriah Pike,' known as 'Lady Dixon,' a form which never produces seeds but flowers very profusely.

Variegated Laurel.—Mr. Crawshay showed foliage of a much variegated form of the common laurel, *Prunus Laurocerasus.* The bush from which this was cut was an old one, and the variegation had proved constant.

Alpine plants.—Mr. Fraser, F.L.S., showed cultivated specimens of a very dwarf form of *Salix herbacea* which he had collected at an elevation of 3,984 feet on Ben Lawers. The height to which it attained in the wind-swept situation in which it was growing was only from ¼ inch to ½ inch. He also showed *Draba rupestris* from the same locality, and *Tofieldia palustris* from an altitude of 2,800 feet in Perthshire, with fruit. These had all been grown in pots, and were somewhat taller than when collected. Mr. Fraser also showed flowers of *Rosa spinosissima*, which is still found growing wild within the county of London, though it does not now fruit. The flowers exhibited were very small, and had been picked from a wild specimen.

Lonicera Standishii.—Mr. Holmes, F.L.S., exhibited ripe fruit of this *Lonicera,* which rarely fruits in Britain.

Aquilegia double.—Mr. Hales drew attention to the doubling of Aquilegias where, somewhat as in the hose-in-hose primrose, the petals are packed one within the other. Mr. Chittenden pointed out that the additional petals were modified stamens, of which the filament became the claw of the petal, while the spur and the limb of the petal were developed from the anther ; in specimens in which the modification had not gone far the two anther lobes could be seen around the mouth of the spur.

Malformed Orchid.—Mr. Rolfe, A.L.S., exhibited an *Odontoglossum* in which the petals had acquired somewhat the coloration of the lip.

Primrose flowering.—Mr. A. W. Hill, F.L.S., said that there was at present flowering at Kew a common primrose which had been brought from Shetland last year, and had thus retained the habit of flowering at the season usual in Shetland.

Trachycarpus excelsus monoecious.—Mr. Bowles exhibited an inflorescence of *Trachycarpus excelsus*, and remarked that although most of the flowers were staminate in the inflorescence for some years, a few pistillate flowers had developed and had produced fruit. This was most evident in the inflorescences which had developed late in the season.

SCIENTIFIC COMMITTEE, JUNE 22, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, with eighteen members present and Professor Hugo de Vries, visitor.

Jessamine shoot with adventitious roots.—Mr. Saunders, F.L.S., showed shoots of white jessamine from a wall, having large numbers of adventitious roots springing from all round the nodes on the stem, and occasionally from internodes. It was suggested that possibly the roots had become dry, and this had induced the plant to attempt to make roots at other parts of the stem. Mr. Pickering, F.R.S., mentioned that the peculiarity of producing abundant adventitious roots appeared to be innate in certain varieties of apples, especially in 'Northern Spy,' the variety so largely used for stocks in New Zealand and other places. Mr. Chittenden, F.L.S., remarked that the same character was to be seen in the variety 'Oslin,' a variety long ago known as the 'Burrknot,' on account of the frequent formation of burrs upon the branches.

Exotic Solanum.—Mr. A. W. Sutton, V.M.H., exhibited a flowering plant of a *Solanum*, the seed of which had been sent him by a correspondent at Monte Video, collected in Uruguay, and called by him "a wild Tomato." The plant was referred to the secretary for further examination. It proved to be *Solanum sisymbrifolium*, first introduced about the beginning of the last century.

Malformations in Trifoliums.—Mr. Fraser, F.L.S., showed examples of *Trifolium hybridum* var. *elegans* (Lavi) with typical forms for comparison, collected at Coulsdon, Surrey, in which the pedicels were elongated and the pistil elongated and stipitate. He also showed *T. fragiferum*, collected at Mitcham, with axial proliferation of the inflorescence, and *T. dubium*, in which the pedicels of the original inflorescence were many times branched and bore many capitula, the sepals showed partial phyllody, the stamens pistilody, the pistils, which were stipitate, showed phyllody; in many flowers axial proliferation was to be seen, and in some cases the capitulum became an elongated raceme.

Flowers of Streptocarpus malformed.—Mr. Odell showed flowers of *Streptocarpus* malformed in a manner similar to those exhibited by him last year (see JOURNAL R.H.S., vol. xxxiv., p. cxii.). This is now the third year in which the plants have borne similarly modified flowers.

Large flower in Apple.—Mr. Pickering, F.R.S., enquired whether anyone had noticed flowers of apples with very numerous petals. He had seen this season in the case of 'Bramley's Seedling' a single flower (the only one on the shoot) which though showing no sign of synanthy, bore twenty-five petals, the stamens and other organs being well developed.

Helianthemum sporting.—Messrs. Barr sent an interesting sport of *Helianthemum* 'Golden Ball,' a yellow variety, bearing branches producing double scarlet flowers in the upper part of the plant.

Nomenclature of multigeneric hybrids.—The secretary read the report of the sub-committee upon the nomenclature of multigeneric hybrids, the committee approving the recommendations contained therein. After being read to the Orchid Committee, it will be presented to the Council for its approval.

Certificate of Appreciation.—A Certificate of Appreciation was recommended to be awarded to Mrs. Scott-Elliott, of Teviot Lodge, Hawick, N.B., for work in connection with the hybridizing of Aquilegias.

SCIENTIFIC COMMITTEE, JULY 20, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and seven members present.

Water Lilies dying.—Mr. Saunders, F.L.S., reported that he had examined the dead water lily rhizome shown at the last meeting, and had failed to find any organism present which would account for the death of the plants. He considered the water in which they were growing very foul. Some further material was referred to Mr. Saunders.

Galls on Rhododendron.—Galls similar to those frequently seen on *R. ferrugineum*, caused by the fungus *Exobasidium rhododendri*, were exhibited on behalf of Mr. Veitch on *Rhododendron Wilsonianum.* The occurrence of these galls in succeeding years may be materially lessened by their removal before they acquire the white bloom which marks the time of spore formation.

Late-flowering Rhododendron.—Sir J. T. D. Llewelyn made some remarks upon a Rhododendron now flowering at Wisley, which he considered to be a hybrid of *R. Aucklandii* or *R. Fortunei.* The bush always flowers at this season, and bears bunches of white flowers on long viscous peduncles subtended by deciduous bracts.

Malformed flower in Lilium auratum.—Mr. Shea showed a flower of this species which for the third year in succession produced very narrow perianth segments, which were green. The plant was very strong, but all the flowers were of this type.

Sweet Pea stripe.—Mr. Shea also showed specimens of sweet peas with the "stripe" disease, the cause of which is unknown.

Sweet Pea double.—Mr. Chittenden, F.L.S., showed a flower of sweet pea with three standards, the only one of the kind on the plant.

Agapanthus umbellatus branched.—Mr. Worthington Smith, F.L.S., sent one of two samples of a branched scape in *Agapanthus.* "Originally there were two branches, but the upper branch was accidentally knocked off; the remains of this were, however, quite distinct. In the umbel will be seen two buds on one pedicel. The growth is caused by the fasciation of scapes, one major and two minor. Whether the character will remain permanent or not is uncertain, as this is the first season of branching."

Sweet Pea with foliar tendrils.—Mr. Bowles drew attention to an exhibit of sweet peas in which all the tendrils were replaced by leaflets, a condition which was said to be fixed.

Ceropegia.—Mr. Ledger showed specimens of Ceropegias from his garden. (1) *Ceropegia Rendallii*, N. E. Brown (*Kew Bull.*, 1894, p. 100, and revised in *Flora Capensis*, vol. iv., 1908, p. 814). Belongs to the section having an umbrella-like canopy surmounting the corolla, as in *C. Sandersonii*, *C. Monteiroae*, and the not-yet-introduced *C. fimbriata.* The tuber of the plant exhibited was sent without specific name by Mr. Thornecroft, of Barberton, to Mr. W. E. Gumbleton, who presented it to Mr. Ledger. It is a small twining species with a remarkable flower, originally sent to Kew by Dr. P. Rendall, of Barberton, after whom it was named, in 1894, and since lost. (2) *C. barbertonensis*, N. E. Brown, n.sp. (*Flora Capensis*, vol. iv., 1909, Addenda and Corrigenda, p. 1,132). The flowers resemble in shape those of *C. Woodii* and of *C. debilis.* Plants were raised by Mr. W. E. Gumbleton, from seed received from Mr. Thorncroft. A certain number of the seedling plants produced leaves variegated with pale green along the veins. Both forms were exhibited. (3) *C. hybrida*, N. E. Brown (*Gard. Chron.*, December 8, 1906, p. 383, with figs.). A distinct and large-flowered hybrid (*C. Sandersonii* ♀ × *C. similis* ♂) raised in the Botanic Garden at Leiden from accidental insect fertilization, and the first and only recorded hybrid. The pollen parent was sent to Leiden by Mr. Ledger, who received it from Kew, where it had long been grown as *C. Thwaitesii*, a Ceylon species, not at present in cultivation. The habit of this hybrid is that of a very attenuated *C. stapeliaeformis.*

Malformation in Honeysuckle.—Mr. Fraser, F.L.S., showed specimens of *Lonicera Periclymenum*, Linn., as follows:—Specimen A showed: (1) chloranthy of the corolla; (2) chloranthy of the stamens; (3) anthers shortened, fleshy, basifixed instead of versatile, and do not open, filaments hirsute instead of being glabrous; (4) chloranthy of the pistil. Specimen B showed: (1) chloranthy of the corolla; (2) petalody of three stamens, phyllody of the other two stamens, two and three-lobed and glandular on both surfaces, like the back of the normal corolla; (3) phyllody of the pistil, the style and three carpels being separated nearly to the base. Specimen C, a double honeysuckle, showed: (1) chloranthy and shortening of the corolla; (2) petalody of the five stamens; (3) petalody of the pistil and duplication of the three carpels, the style of the three carpels being separated nearly to the base and then duplicated, hose-in-hose fashion; thus there were eleven supernumerary petals. In each case the malformation occurred on plants attacked by aphides.

SCIENTIFIC COMMITTEE, AUGUST 3, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and seven members present.

Diseased Water Lilies.—Mr. Saunders, F.L.S., reported that he had been unable to discover any insect or fungus pest upon the water lilies sent to the last meeting, and he considered it probable that the condition of the water, which smelt very unpleasant, was the cause of the death of the plants.

Sparrows and Water Lilies.—Mr. Hales showed leaves of water lilies with a large number of scratches upon them, caused by sparrows' feet. The sparrows stand upon the leaves in order to reach the water, and scratch the leaves in their endeavour to retain their balance.

Poinciana regia.—Mr. S. P. Lancaster, of Alipur, Calcutta, sent drawings illustrating the variation in the gorgeous flowers of this beautiful plant.

Green Sweet Pea.—Rev. W. Wilks, M.A., exhibited flowers of a sweet Pea of a yellowish-green colour. The plants had come true from seed.

Malformed Pea.—Mr. E. E. Turner, Coggeshall, sent a flower of the culinary pea showing axial proliferation and various malformations, particularly in producing free stamens and regular petals in some of the small proliferated flowers.

Cones of Pinus Sabiniana.—Mrs. Hadley, of Parkside, Reigate, sent two huge cones of this pine from a tree grown in her garden which had carried five cones.

Rose leaf with stipules to leaflets.—Mr. Saunders showed a specimen of rose leaves with stipules to the leaflets which he had gathered in a garden near Dorking.

SCIENTIFIC COMMITTEE, AUGUST 17, 1909.

Mr. E. A. BOWLES, M.A., F.L.S , F.E.S., in the Chair, and eight members present.

Variation in seedling Carnations.—Mr. Douglas, V.M.H., showed numerous flowers of seedling tree carnations raised from seed saved from self-coloured varieties. He pointed out that among them were several singles in the proportion of about 12 per cent. of the whole, but the greatest peculiarity lay in the large number of striped flowers which were produced. The parents were white, pink, or red, but among the progeny was one with yellow flowers striped with purple.

Proliferation in Campanula.—Mr. Bowles showed specimens of *C. persicifolia* with axial proliferation, a number of green foliage leaves growing from the centre of the flower. Some of the shoots, which were from the garden of Mrs. Trotter, Hill House, Wormley, also showed fasciation.

Gerbera not flowering.—Heads of *Gerbera* were received, the sender thinking they were from a plant of *Gerbera Jamesonii* which had failed to produce flowers before seeding, but the heads were from *G. Kunzeana*, a plant from the Himalayan region, which does not open its flower-heads to any extent.

Potato with aërial tubers.—From Mr. Bevan, of East Finchley, came potato stems bearing tubers in the axils of the foliage leaves, a condition of things which frequently follows from injury to the soft bast tissues near the base of the stem preventing the downward flow of food from the leaves.

Double Sweet Peas.—Mrs. A. P. Rigby, of Pentre Mawr, Trefnant, N. Wales, sent several flowers of sweet peas having two or three standards instead of but one. The variation had occurred last year, and seed had been produced from the flowers, which had this year given rise to a proportion of plants bearing double flowers. Other varieties than the first-named had also produced double flowers this year.

Wheat-ear Carnation.—From Mr. B. Nash, of The Gardens, Oakleigh, Cheam, came specimens of the wheat-ear carnation, which, instead of flowers, bears a long series of bracts repeated again and again.

East African Sandal Wood.—Mr. F. H. Seed, of the Agricultural Department, Mombasa, British East Africa, sent seed of the East African sandal wood tree (*Brachylaena* sp.), called by the natives "Muhugu." "The seed," writes Mr Seed, "is as light as thistle-down. The natives reported that this tree did not produce seed, but it was found that the thistle-down lightness of the seed caused it to be caught on the tops of the long native grasses and undergrowth. The Forestry Department has now arrested this loss by clearing the ground around the trees, so that the seed will reach the earth. The tree is considerably larger than the Indian sandal.

"One square piece and two small pieces were sent to be valued in Bombay Market during the year 1908, and an order was received from a merchant there offering half-a-guinea a cubic foot."

British alpine plants.—Mr. Fraser, F.L.S., showed a flowering plant of *Saxifraga cernua*. The plant bore six flowers and some buds. It was 7 inches high and had ten stems arising from the base. It had been collected at the top of Ben Lawers, and is very rarely seen in cultivation. Numerous bulbils were borne in the axils of the stem leaves, and it is by these the plant is propagated. He also showed *Draba rupestris* flowering for the second time this year, flowering specimens of *Salix Arbuscula* × *herbacea* (flowering for the second time this year), and *Alchemilla alpina*, the last having flowered continuously since May.

SCIENTIFIC COMMITTEE, AUGUST 31, 1909.

Mr. G. MASSEE, F.L.S., V.M.H. in the Chair, with six members present and Messrs. H. Alexander, E. H. Wilson, and F. N. Meyer (of the U.S.A. Dep. Agr.), visitors.

Malformations in Trifolium.—Mr. Fraser, F.L.S., showed specimens of *Trifolium hybridum* with the pedicels elongated, the calyx with elongated teeth, the petals widely separated and the stamens exposed, and the pistil developed into a trifoliate leaf consisting of a stalk bent in the part where the style usually begins, and carrying the leaflets above this. As he remarked, according to this evidence the ovary is made up of the base of the petiole with its stipules, the top of the petiole forms the style, and the leaflets form the stigma of the normal flower. He also showed *T. pratense* with the primary capitulum having two opposite bracts at its base, above these a calyx with many teeth, springing from the inside of which were the pedicels unusually elongated, then a second calyx enclosing a corolla of five petals, sometimes partly affected with chloranthy, and exposed stamens, then a leafly bract, and in the centre numerous flowers. Each of the central flowers had a well-formed calyx and was apetalous, with exposed stamens and a small pistil in the centre. The chairman remarked that the occurrence of virescence such as was exhibited in the specimens shown was the result of the attack upon the base of the plant of the grub of a fly belonging to the family Diptera.

Hybrid Radicula.—Mr. Fraser also showed specimens of what he considered to be a hybrid between *Radicula* (*Nasturtium*) *palustris and R. sylvestris.* The plant had occurred in company with both its supposed parents, and had imperfect flowers. In most of its characters it appeared midway between the two plants named, although perhaps nearer to *R. palustris.*

The Wonderberry.—Mr. Cuthbertson showed a specimen of the American 'Wonderberry,' said to have been raised by Mr. Burkank. He also showed *Solanum nigrum* for comparison. The plant, though differing in some few details from the specimen of *Solanum nigrum* shown, is apparently only a form of that very widespread and variable weed of cultivated land. Mr. Meyer remarked that the fruit of *S. nigrum* was frequently made into pies and eaten in different parts of the States, and he was unable to distinguish the plant exhibited from the spontaneously occurring plant.

Spencer Sweet Peas.—Mr. Cuthbertson also made some remarks regarding the reasons why the 'Spencer type' of sweet pea is shy in producing seed, showing photographs (fig. 84) and flowers in illustration of his remarks. The reasons he considers to be as follows :—

1. The keel is not constricted or clamped, and consequently the anthers and stigma are not compressed together as in the old type of flower.

2. The open keel tends to allow the pollen to drop into the base of the keel without coming in contact with the stigmatic point. In the old type this was hardly possible.

3. In many of the waved forms the style grows beyond the anthers before the anthers dehisce, and the point is thus never brought into contact with the pollen.

4. In some, notably salmon and orange-coloured varieties, the anthers are nearly sterile.

5. The large waved standard does not act as an umbrella in bad weather. The hooded standard deflects the rain from the vital parts of the flower.

Note.—The Unwin or moderately waved type of flower is a good seeder. It follows the old type very closely in the formation of its keel.

Chinese Plants.—Mr. E. H. Wilson showed an interesting series of photographs of some of the plants he had met with in his last travels in China. Among them were pictures of—

1. *Pinus Bungeana*, taken in S.W. Ichang, at an altitude of 3,500 feet, showing the white bark of the stem and exposed parts of the root. Mr. Wilson said he regarded this pine and *Pinus sylvestris*, which has in certain parts of the world a very light bark, as the two most picturesque of the pines.

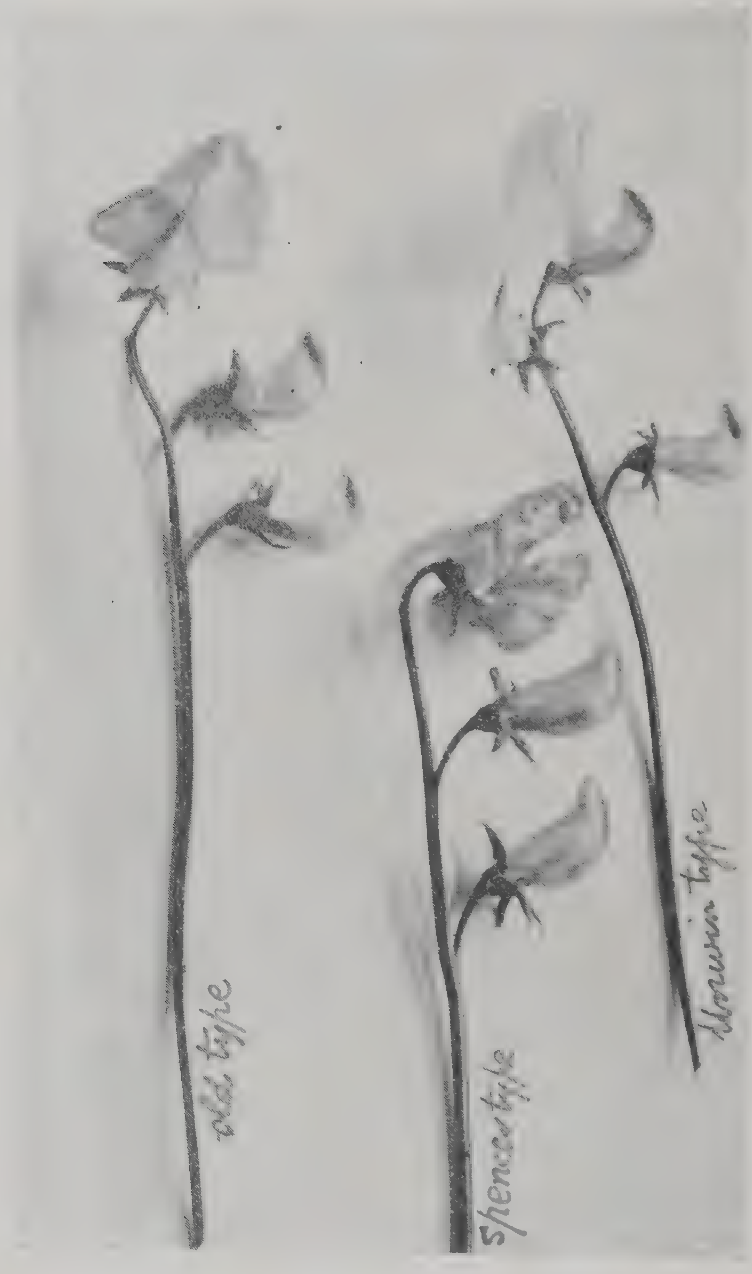


FIG. 84.—TYPES OF KEEL IN SWEET PEAS. (p. cxxiii.)

2. *Cunninghamia sinensis*, a solitary tree 130 feet in height and 20 feet in girth. This tree forms pure forest in China at an elevation of 5,000 feet, and is the commonest timber tree in Central China, where it is very valuable. The photograph was taken in S.W. Tatien-lu.

3. *Gingko biloba.* Mr. Wilson remarked that it had recently been stated that this tree occurred truly wild in China, but although he

had traversed the whole of the district where it was said to occur, he had found only planted trees. The photograph was taken at Kiating, and depicted a tree 90 feet high and 24 feet in girth.

4. *Actinidia chinensis*, a beautiful shrub producing green fruit with a russet tinge, of excellent flavour as a dessert fruit, and making good preserves. This plant has flowered in France and England, but so far only staminate flowers have been produced. Hermaphrodite flowers are borne by some plants, and, perhaps rarely, pistillate flowers only.

5. *Cypripedium tibeticum.*—This is one of the commonest herbaceous plants in open places at an altitude of 11,500 feet to 12,000 feet.

Sport in Phlox decussata.—From Mr. Douglas, V.M.H., came an inflorescence of *Phlox decussata*, some of the flowers of which were white with the faintest tinge of violet, and others (the greater number) were white with broad stripes of violet-mauve. The plant had for fifteen years borne only white flowers, but last year had some coloured flowers, and again this year.

Winter-rot in Potatos.—Mr. Wigley sent from Hartridge, Gravesend, specimens of potato badly affected with winter rot, due to *Fusarium solani*. The variety, Midlothian Early, had been lifted as soon as the tops died down, and some tubers selected for seed next season; these were placed in the sun to "green," and had "sweated with dark liquid drops at the eyes, and had softened on that side and then shrivelled." None of the stored potatos (kept cool) showed signs of the disease at present, while 50 per cent. of the portion saved for seed were affected. It appeared evident that the tubers had become infected with the fungus from the soil while growing.

Large Larch Sawfly.—Mr. Holmes, F.L.S., sent specimens of the larvæ of this destructive insect (*Nematus Erichsoni*) collected in the Lake District, where the larch is being defoliated by them on Latrigg and Skiddaw. This insect seems likely to destroy the larches in the district unless some natural enemy should prove effective in checking it.

Malformed Cypripedium.—Mr. Richards, of Usk Priory, sent a flower of *Cypripedium insigne* in which the two lateral petals had a slight tendency towards the form of the lip, and the bract was green and leathery instead of membranous.

Aster diseased.—From Patcham, Sussex, came specimens of asters attacked by a species of *Fusarium*. This fungus attacks the plants by the roots, which are killed, and the plant wilts through lack of water. It is unsafe to plant asters in soil where they have previously been attacked, and the soil in which they are grown should be limed.

"Shot-hole" in Peaches.—Specimens of peach leaves from near Eastbourne showed round browned patches, and in some cases holes, from which the dead tissue had fallen out. The committee was unanimously of opinion that the spots were due to the "shot-hole" fungus.

FRUIT AND VEGETABLE COMMITTEE.

SUB-COMMITTEE AT WISLEY, APRIL 27, 1909.

Awards recommended :—

Award of Merit.

Strawberry 'Climax' (Laxton). As a forcing variety. **A.M.**
Strawberry 'Royal Sovereign' (Laxton). As a forcing variety. **A.M.**

FRUIT AND VEGETABLE COMMITTEE, MAY 4, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver Knightian Medal.

To Messrs. Sutton, Reading, for a collection of early vegetables.
To Messrs. Veitch, Chelsea, for early vegetables.

Other Exhibits.

Mrs. Bischoffsheim, Stanmore : Strawberries.
O. P. Serocold, Esq., Taplow : Apple, 'Baxter's Pearmain.'

FRUIT AND VEGETABLE COMMITTEE, MAY 18, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Silver Knightian Medal.

To P. L. Brandt, Esq., Bletchingley, for eight dishes of fruit.
To Messrs. Veitch, Chelsea, for early vegetables.

Award of Merit.

To Strawberry 'George Monro' (votes, unanimous), from H. Staples, Esq., Swanley. A cross between 'Royal Sovereign' and 'Sir Chas. Napier.' In shape and size of the fruit it resembles the former, but the leaves show distinct signs of 'Sir Chas. Napier.' It appears to be an exceedingly prolific variety, and the large bunches of fruit are held well out from the leaves. The flavour is excellent, and judging from the plants exhibited it is very vigorous.

Other Exhibits.

Countess Cowper, Pangshanger : Lettuce.
Mr. H. P. Fitzgerald, Condhurst : forced vegetables.

Jamaica Agency, Holborn : Mangos, &c.
F. Lloyd, Esq., Coombe House, Croydon : fruits of *Ficus repens.*

FRUIT AND VEGETABLE COMMITTEE, JUNE 8, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and eighteen members present.

Awards Recommended :—

Gold Medal.

To the Duke of Portland, Welbeck (gr. Mr. J. Gibson), for a collection of fruit.

Cultural Commendation.

To Miss Dixon, Elmcroft Nurseries, Chichester, for Melons.

Other Exhibits.

Mr. J. B. Allan, Worksop : Melons.
F. May, Esq., Radlett : Melon × Marrow 'Houndswood Early.'
Messrs. Chatfield, Southwick, Brighton : Strawberries.
Messrs. Sutton, Reading : Broccoli.
G. W. Tyser, Esq., Mortimer : Loquats (fruits of *Eriobotrya japonica*).

FRUIT AND VEGETABLE COMMITTEE, JUNE 22, 1909.

Mr. A. H. PEARSON in the Chair, and twenty-four members present.

Awards Recommended :—

Silver Knightian Medal.

To Messrs. Veitch, Feltham, for a collection of Lettuces.

Other Exhibits.

Anglo-French Stour Valley Gardening School : forced salad plants.
Messrs. Kelway, Langport : Cauliflowers.
Miss S. Miller, Marlow : bottled fruit and chutney.
Mr. H. Townsend, Nether Street, Finchley : Melon 'Benchfield Favourite.'
Mr. J. Vert, Saffron Walden : Tomato 'Futurity.'

FRUIT AND VEGETABLE COMMITTEE, JULY 6, 1909, AT HOLLAND PARK.

For Cups and Medals awarded by the Council see page ci.

Mr. G. BUNYARD, V.M.H., in the Chair, and seventeen members present.

No awards were recommended by the Committee.

Exhibits.

Messrs Laxton, Bedford : Strawberries.
Mrs. Seligman, Etchingham : Melon 'Veitch's Eminence.'
Mr. F. Fleetwood Paul, Botley : Tomato 'Miss Paul.'

Fruit and Vegetable Committee, July 13, 1909.

Sub-Committee at Wisley.

Mr. G. Bunyard, V.M.H., in the Chair, and eight members present.

The Sub-committee recommended the following Cabbage Lettuces to be taken to the Hall and placed before the full Committee :—Nos. 1, 38, 48, 76, 79, 20, 70, 90, 23, 30, 33, 36, 42, 53, 62, 68, 84, 91, 95, 97, 107, and 110. (See Report, p. 266).

Fruit and Vegetable Committee, July 20, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Gold Medal.

To Messrs. Veitch, Chelsea, for a collection of fruit trees in pots.

Silver-gilt Banksian Medal.

To Messrs. Carter, High Holborn, for Peas and Tomatos.
To Messrs. Sutton, Reading, for Tomatos in pots.

Silver Knightian Medal.

To Messrs. Veitch, Chelsea, for a collection of vegetables.

Silver Banksian Medal.

To Messrs. Rivers, Sawbridgeworth, for Cherries in pots.

Other Exhibits.

Mr. J. Harris, Blackpill Nurseries, Swansea : Potato 'Lady Llewelyn.

Twenty-two varieties of Cabbage Lettuces from the trial at Wisley were examined, but no awards were made, owing to the most distinct in each section having been certificated previously.

Fruit and Vegetable Committee.

Sub-Committee at Wisley, July 27, 1909.

Mr. W. Bates in the Chair, and two members present.

Awards Recommended :—

Award of Merit.

To Melon 'Barnett Hill Favourite' (p. cxxix).

The following Lettuces were ordered to be placed before the full Committee on August 3 :—

Cos : Nos. 2, 7, 8, 16, 23, 34.
Cabbage : Nos. 37, 47, 96.

FRUIT AND VEGETABLE COMMITTEE, AUGUST 3, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and ten members present.

Awards Recommended :—

Gold Medal.

To Messrs. J. Veitch, Chelsea, for a collection of Gooseberries.

Award of Merit.

To Melon 'Barnett Hill Favourite' (votes, unanimous), from Mr. A. Mitchelson, Wonersh, Guildford. Fruit large, round, skin deep yellow, heavily netted; flesh white, thick, very melting, and of delicious flavour. Seed cavity very small. A good grower and free setter. Tested at Wisley.

The following Lettuces were highly commended (**XXX**) after trial at Wisley (see Report, p. 266):—

Cos Lettuces:
- 'Baldwin,' from Messrs. Carter.
- 'Chesnay Large White,' from MM. Vilmorin-Andrieux.
- 'Covent Garden Summer White,' from Messrs. Barr.
- 'Emerald Queen,' from Messrs. Barr.
- 'Immense Green,' from Messrs. Harrison.
- 'Paris Early,' from Messrs. J. Veitch.

Cabbage Lettuces:
- 'Giant,' from Messrs. Sutton.
- 'Heartwell,' from Messrs. Sutton.
- 'Stuttgart Danerkopf,' from Messrs. Pfitzer.

Other Exhibits.

Mr. J. Harris, Blackpill Nurseries, Swansea: Potatos.
Messrs. J. K. King, Coggeshall: culinary Peas.
Messrs. J. Salsbury, Melbourne, Derbyshire: Gooseberry.
Messrs. S. Spooner, Hounslow: early Apples.

FRUIT AND VEGETABLE COMMITTEE.

SUB-COMMITTEE AT WISLEY, AUGUST 12, 1909.

Mr. W. BATES in the Chair, and five members present.

The following were highly commended (**XXX**), and ordered to be placed before the full Committee on August 17.

French Beans: 'Cholet,' 'Everyday,' 'Evergreen,' 'Excelsior,' 'Golden Wax,' 'Holborn Wonder,' 'Kaiser,' 'Longsword,' 'The Belfast,' 'Superlative.'

Peas: 'Lord Leicester,' 'Mayor of Leicester.'

FRUIT AND VEGETABLE COMMITTEE, AUGUST 17, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and fourteen members present.

The following Peas and Beans were placed before the Committee upon the recommendation of the Sub-Committee at Wisley on August 12:—

Awards Recommended:—

Dwarf French Beans.

Award of Merit.

'Cholet' (votes, unanimous), from M.M. Vilmorin-Andrieux, Paris.
'Evergreen' (votes, unanimous), from Messrs. Sutton, Reading.
'Excelsior' (votes, unanimous), from Messrs. Barr, Covent Garden.
'The Belfast' (votes, unanimous), from Messrs. Dickson, Belfast.

Highly Commended (**XXX**).

'Everyday,' from Messrs. J. Veitch, Chelsea.
'Golden Wax,' from Messrs. Carter, Holborn.
'Holborn Wonder,' from Messrs. Carter, Holborn.
'Kaiser,' from Messrs. R. Veitch, Exeter.
'Longsword,' from Messrs. Carter, Holborn.
'Superlative,' from Messrs. Sutton, Reading.

Peas.

Highly Commended (**XXX**).

'Lord Leicester' and 'Mayor of Leicester,' from Messrs. Harrison, Leicester.

Other Exhibits.

Mr. J. Coles, Balcombe: Gooseberries.
Mr. H. Parr, New Barnet: Melon, 'Trent Perfection.'
W. R. Pierce, Esq., Canterbury: seedling Apple.
Mr. R. Thompson, Prudhoe, Northumberland: seedling Gooseberry.
Mr. W. H. Young, Romford: Tomato.

FRUIT AND VEGETABLE COMMITTEE, AUGUST 31, 1909.

Mr. A. H. PEARSON in the Chair, and nineteen members present.

Awards Recommended:—

Gold Medal.

To the King's Acre Nurseries, Hereford, for pot fruit trees.

Silver-gilt Knightian Medal.

To Messrs. T. Rivers, Sawbridgeworth: for pot fruit trees.

Silver Knightian Medal.

To Sir Mark Collet, Bart., Sevenoaks, (gr. Mr. M. Nicholls): for six dishes of Pears.

Silver Banksian Medal.

To Messrs. Spooner, Hounslow: for a collection of Apples.

Hogg Medal (for Culture).

To His Majesty the King for Grape 'Black Hamburg' cut from the old vine in the Royal Gardens, Hampton Court (gr. Mr. McKellar).

Other Exhibits.

Messrs Bunyard, Maidstone: Plum 'Wickson.'
Mr. G. Dyke, Milborne Port, Somerset: Apple 'Cheriton.'
Mr. C. F. Etteridge, Enfield: Red Currant seedling.
Mr. H. Goodacre, Derby: Apple 'Ellison Orange.'
Mr. W. G. Holmes, Tain: Gooseberries.
T. Simpson Jay, Esq., Putney Hill, S.W.: Melons.
R.H.S.Gardens, Wisley (Mr. S. T. Wright, Supt.): collection of Grapes.
Mr. A. Tidy, Cobham: Potato 'Beauty of Braywick.'
Mr. H. Wigley, Gravesend: Potatos.

Mr. O. Thomas proposed, and Mr. Cheal seconded, that a vote of condolence be sent from the Fruit Committee to the widow of the late Mr. P. Kay.

FLORAL COMMITTEE.

May 4, 1909.

Mr. H. B. May in the Chair, and twenty-six members present.

Awards Recommended:—

Gold Medal.

To Mr. J. Douglas, V.M.H., Bookham, for Auriculas.
To Messrs. Mount, Canterbury, for Roses.

Silver-gilt Flora Medal.

To C. F. Raphael, Esq., Shenley, for Carnations.
To Messrs. J. Veitch, Chelsea, for Phyllocacti, &c.
To Messrs. R. Veitch, Exeter, for Himalayan Rhododendrons.

Silver-gilt Banksian Medal.

To Messrs. Peed, Streatham, for alpines.
To Mr. Prichard, Christchurch, for alpines.

Silver Flora Medal.

To Messrs. B. Cant, Colchester, for Roses.
To Messrs. Carter, Holborn, for Cinerarias.
To Messrs. Cutbush, Highgate, for Carnations, &c.
To Messrs. Cuthbert, Southgate, for Azaleas.
To Messrs. May, Upper Edmonton, for flowering plants and Ferns.
To Messrs. W. Paul, Waltham Cross, for Roses.

Silver Banksian Medal.

To Messrs. Bakers, Codsall, for alpines.
To Mr. H. Burnett, Guernsey, for Carnations.
To Messrs. F. Cant, Colchester, for Roses.
To Messrs. Clark, Dover, for Sweet Peas and alpines.
To Messrs. Dobbie, Rothesay, for Violas.
To Mr. Gill, Falmouth, for Rhododendrons.
To the King's Acre Nurseries, Hereford, for Heliotropes.
To Messrs. H. Low, Enfield, for Carnations, &c.
To Messrs. Waterer, Bagshot, for Rhododendron 'Pink Pearl.'

Bronze Flora Medal.

To Messrs. Bunyard, Maidstone, for alpines.
To Messrs. Cannell, Swanley, for Pelargoniums.
To Mr. Mortimer, Rowledge, for Polyanthus.
To Messrs. Paul, Cheshunt, for new shrubs.
To Mr. Perry, Enfield, for alpines.
To Mr. G. Reuthe, Keston, for alpines.
To Messrs. Ware, Feltham, for Primulas.

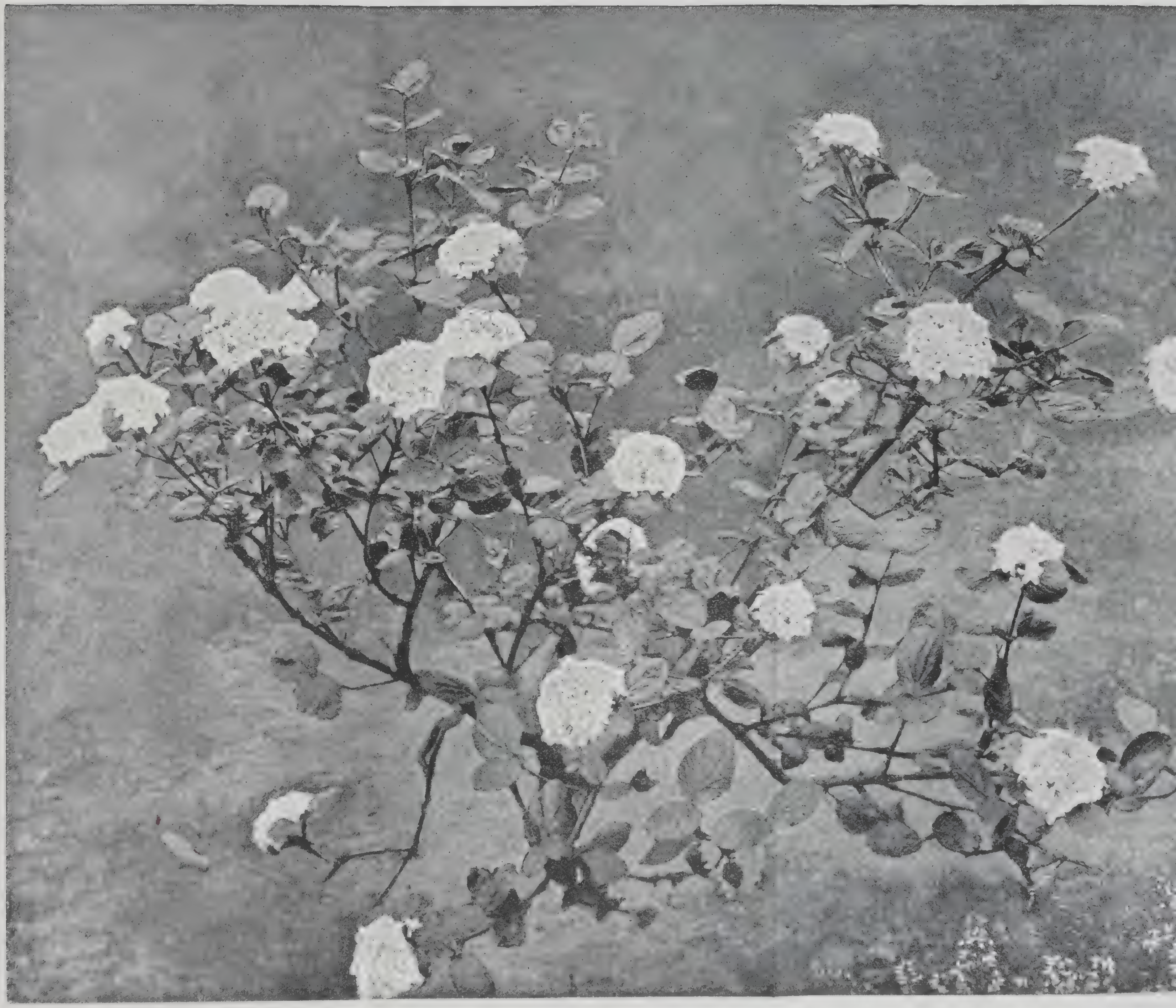


Fig. 85.—Viburnum Carlesii. (*Gardeners' Chronicle.*) (p. cxxxiii.)

(*To face p*

Bronze Banksian Medal.

To Messrs. Carter Page, London Wall, E.C., for Violas, &c.

Cultural Commendation.

To Mr. W. Bain (gr. to Sir Trevor Lawrence, K.C.V.O.), Burford, Dorking, for *Tacca cristata.*

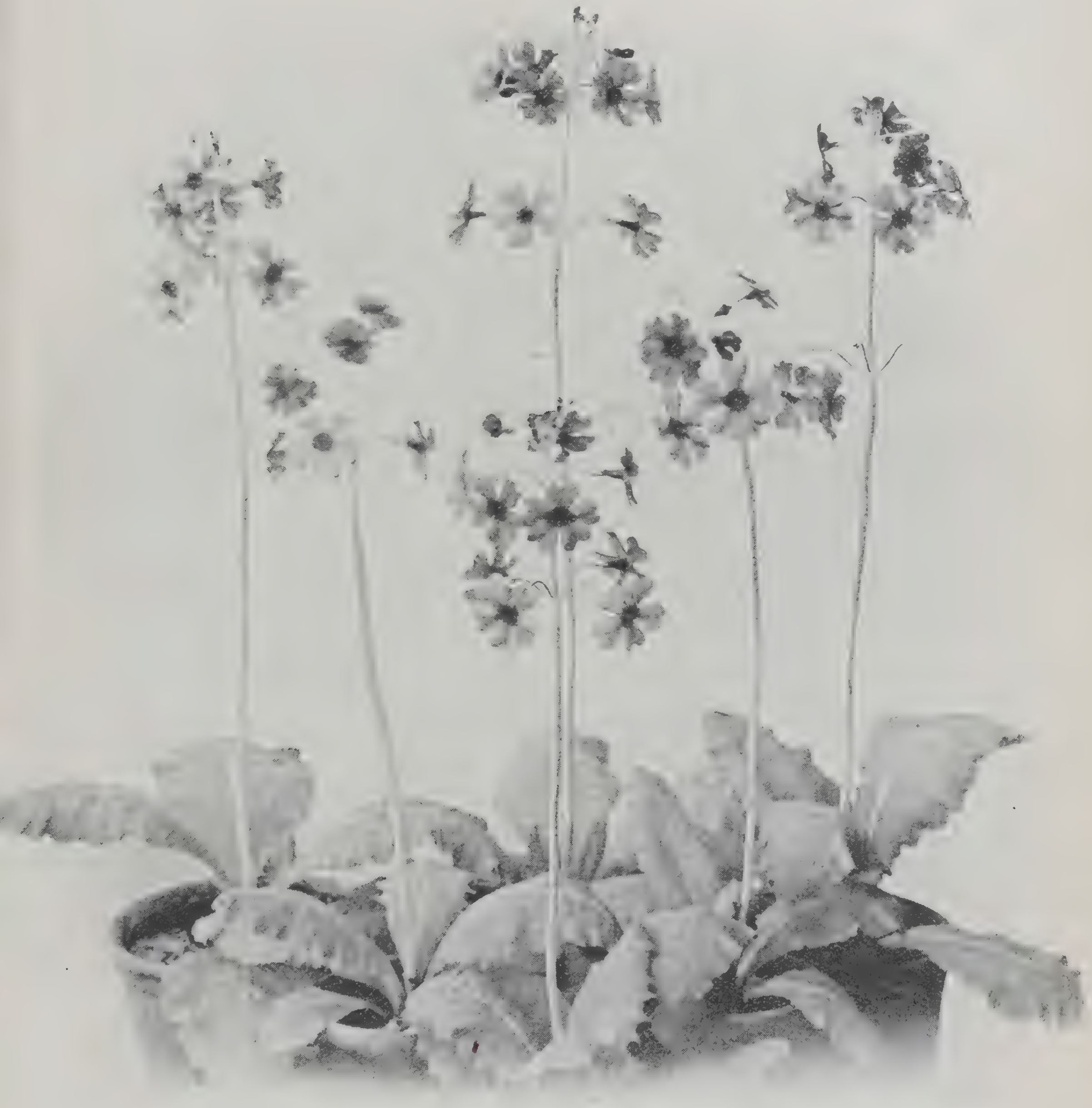


Fig. 86.—Primula × 'Unique improved.' (*Veitch.*) (p. cxxxv.)

First-class Certificate.

To *Viburnum Carlesii* (votes, unanimous), from Sir Trevor Lawrence, K.C.V.O., V.M.H. (gr. Mr. Bain), Burford, Dorking. The plant exhibited had been growing without protection during the winter, and has withstood 29° of frost. Exhibited on April 14, 1908, it received an Award of Merit; the flowers on that occasion were pure white, but in this specimen were tinged with pale reddish-blue. (See Journ. R.H.S., Vol. xxxiv. p. xlv.) (Fig. 85.)

Award of Merit.

To *Cineraria* × *flavescens* (votes, unanimous), from Messrs. J. Veitch, Chelsea. Flowers creamy yellow, fading to creamy white; eye tinged with pale purplish-brown. Leaves broadly ovate, dentate. A hybrid between *Cineraria* 'Feltham Beauty,' and *Senecio auriculatissimus*. Flowers have the size and form of the Cineraria, but are without a trace of the blue colour.

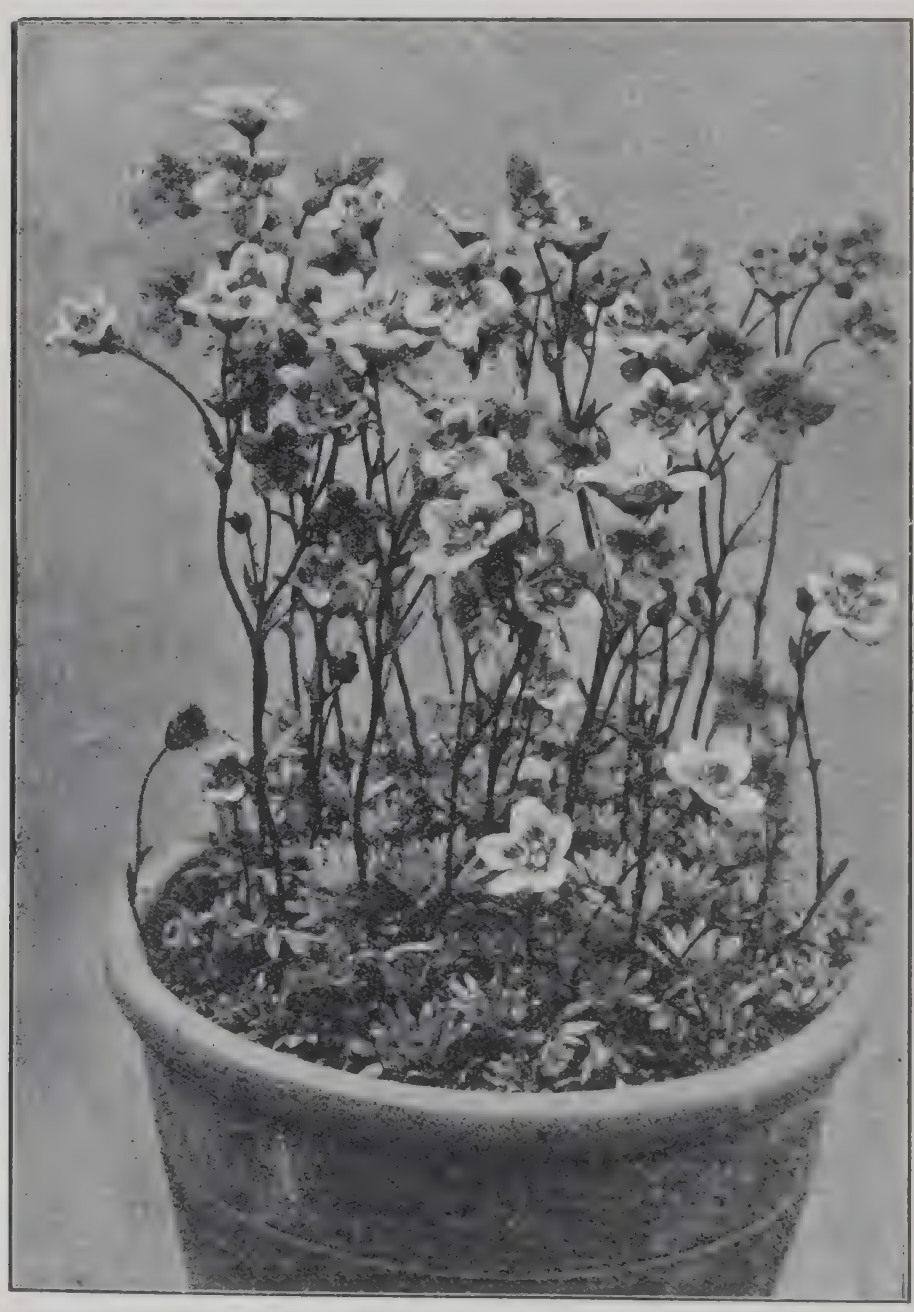


FIG. 87.—SAXIFRAGA CLIBRANII. (*Clibrans.*) (p. cxxxv.)

To *Hydrangea hortensis alba* (votes, 15 for, 1 against), from Messrs. H. Low, Enfield. A large pure white sport from *H. hortensis*. Pedicels ivory white; flowers 2 inches across, of good substance; truss large.

To *Nephrolepis lycopodioides* (votes, unanimous), from Messrs. Rochford, Turnford, Broxbourne. A beautiful compact crested *Nephrolepis*, but very much like many others of the same class.

To *Primula* × 'Unique improved' (votes, 13 for), from Messrs. J. Veitch, Chelsea. A hybrid between *P. Cockburniana* ♀ and *P. pulverulenta* ♂. Flowers arranged as in *P. pulverulenta*, with colour midway between that and *P. Cockburniana*—deep cerise. Pedicels and calyx mealy; leaves dentate, undulate, glabrous. (Fig. 86.)

To *Saxifraga Clibranii* (votes, 11 for, 5 against), from Messrs. Clibrans, Altrincham. Flowers large, deep lilac, very freely produced on reddish stems 4 inches high. The ovary is rather conspicuous, and forms a green centre to the flower. (Fig. 87.)

To *Saxifraga decipiens Arkwrightii* (votes, 11 for, 3 against), from Messrs. Bakers, Wolverhampton. Flowers white, ½ inch across; pedicels and calyx tinged with pink. Very free flowering.

Other Exhibits.

Miss Angel-Scott, Culford Gardens, S.W.: *Billbergia nutans.*
Messrs. Barr, Covent Garden: alpines.
Mr. C. W. Breadmore, Winchester: Sweet Peas and Carnations.
Mr. W. J. Brown, Stamford: Gaillardias.
Messrs. Cheal, Crawley: trees and shrubs.
C. H. Coombe, Esq., Cobham: *Pelargonium* 'Miss Dorothy.'
J. Cunningham, Esq., Omagh, Co. Tyrone: *Bellis perennis* 'Rosy Gem.'
H. J. Elwes, Esq., Colesborne: Irises.
D. Godman, Esq., Horsham: *Rhododendron lacteum.*
Guildford Hardy Plant Nursery: alpines.
Misses Hopkins, Shepperton: alpines.
Mr. W. P. Horton, Seaford: alpines, &c.
Messrs. Jackman, Woking: alpines.
Mr. Kitley, Bath: *Saxifraga decipiens Colstonii.*
Messrs. Phillips and Taylor, Bracknell: alpines.
Mr. Prince, Longworth: Roses.
Mr. H. C. Pulham, Stanstead: alpines.
Mr. L. R. Russell, Richmond: Clematis.
Miss Smith, Barnham, Bognor: alpines.
Rev. A. W. Upcher, Halesworth: Polyanthus.
H. E. Wootton, Esq., Neasden: Auricula 'Emperor.'

FLORAL COMMITTEE, MAY 18, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended:—

Gold Medal.

To Messrs. T. Rochford, Broxbourne, for a group of Rambler Roses.

Silver-gilt Banksian Medal.

To Mr. A. Perry, Enfield, for hardy plants.

Silver Flora Medal.

To Messrs. May, Edmonton, for flowering plants and Ferns.
To Messrs. Mount, Canterbury, for Roses.

To Mr. G. Reuthe, Keston, for hardy plants.
To Mons. Correvon, Geneva, for alpines.

Silver Banksian Medal.

To Messrs. Bunyard, Maidstone, for herbaceous plants, &c.
To Messrs. Cheal, Crawley, for shrubs and trees.
To Sir E. Loder, Bart. (gr. Mr. Cook), Horsham, for hardy plants.
To Messrs. Cutbush, Highgate, for Carnations.
To Messrs. Dobbie, Rothesay, for Violas and Sweet Peas.
To Messrs. Low, Enfield, for Roses, Carnations, &c.
To Messrs. Wm Paul, Waltham Cross, for Roses.
To Mr. M. Prichard, Christchurch, for alpines.

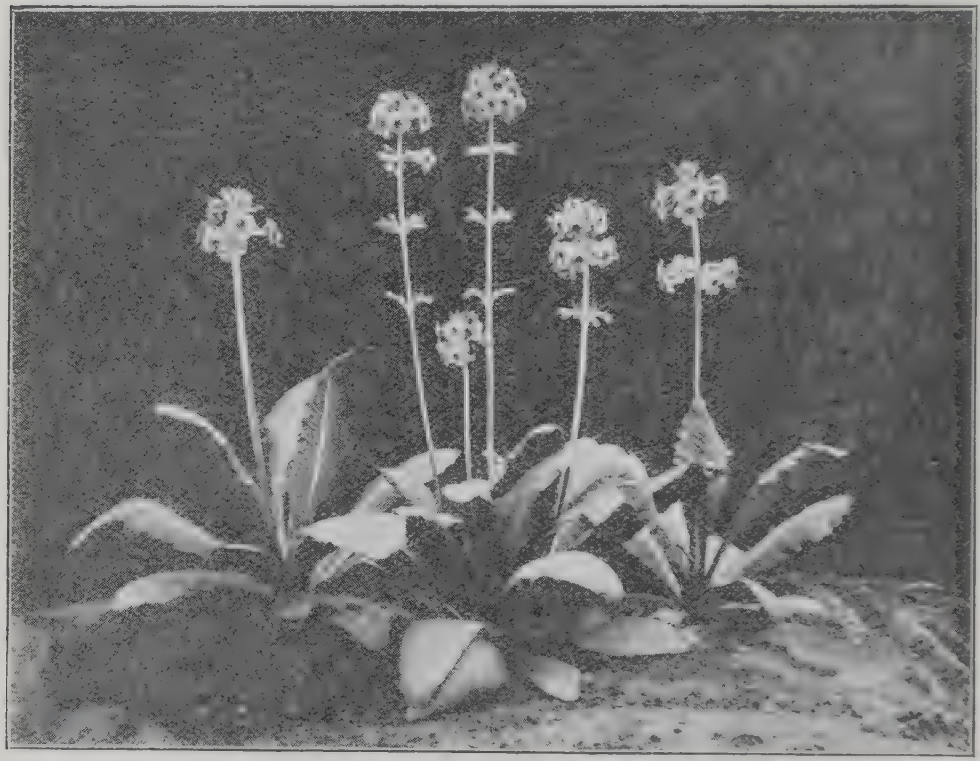


FIG. 88.—PRIMULA BULLEYANA. (*Bees.*)

To Messrs. Ware, Feltham, for alpines.
To Messrs. Waterer, Bagshot, for Rhododendrons.
To Mr. Turner, Slough, for miscellaneous flowering plants.

Bronze Flora Medal.

To Messrs. Peed, Streatham, for alpines.

First-class Certificate.

To *Primula Bulleyana* (votes, unanimous), from Messrs. Bees, Liverpool. Inflorescence 12 15 inches high of 2–4 whorls. Rachis and pedicels mealy. Flowers $\frac{1}{2}$ inch in diameter, orange cadmium (*R.H.S. Colour Chart*, 49. 1). Leaves bright green, spathulate, finely serrate. Midribs tinged reddish purple at base. Collected by Mr. Forrest in China, and has proved perfectly hardy. (Fig. 88.)

To *Rhododendron Soulici* (votes, 15 for, 1 against) from Messrs. J. Veitch, Chelsea. A beautiful dwarf species collected by Mr. Wilson in Tatien Lu, at an altitude of 9,000–11,000 ft. Leaves elliptic, 2 inches long, dark green above, paler below, in the young state glaucous, revolute in the bud. Petioles and young stems glandular-hairy. Flowers 2 inches across, flat, pale rose, a little deeper towards the edge and on the backs of petals. Style and ovary glandular. Calyx segments ¼ inch long, ovate, obtuse, glandular ciliate. Has withstood the winter outdoors without protection. (Fig. 89.)

Award of Merit.

To Rose 'Lyon' (votes unanimous). Bushes were shown by Messrs. Rochford, and a standard by Messrs. Low. Flowers, of excellent form, much finer on dwarfs than on the standard, salmon, shading to a yellowish tint at base of petals, sweetly scented.

To *Saxifraga decipiens* 'Miss Willmott' (votes, unanimous), from Messrs. Bakers, Codsall. A variety much like *S. decipiens Arkwrightii*, but of a more decided tone of colour. Rachis and pedicels, tinged with purple, glandular-hairy. Flowers white, marked with purple. The buds are tinged with reddish-purple, and make an effective contrast with the white flowers.

Other Exhibits.

Messrs. Bakers, Wolverhampton : Violas.
A. Bartholomew, Esq., Reading : *Anacyclus formosus.*
Messrs. Bees, Liverpool : Primulas and Incarvilleas.
Mrs. Bischoffsheim, South Audley Street, W. : Single Chrysanthemums.
Messrs. Brown, Stamford : herbaceous plants.
Messrs. B. Cant, Colchester : Roses.
Messrs. F. Cant, Colchester : Roses.
Messrs. Cannell, Swanley : Pelargoniums, &c.
Messrs. Cayeux and Le Clerc, Paris : *Impatiens* × *comoricoma.*
Messrs. Carter Page, London Wall : Dahlias, Violas, &c.
Messrs. Clark, Dover : herbaceous plants.
C. Elliot, Esq., Stevenage : *Myosotis sylvatica* 'Clarence Elliot.'
Messrs. Heath, Cheltenham : Pelargoniums.
Mr. H. Hemsley, Crawley : alpines.
Misses Hopkins, Shepperton : alpines.
E. J. Johnstone, Esq., Groombridge : Sweet Peas.
Mrs. Lloyd Edwards, Llangollen : Aubretias, &c.
Messrs. Low, Enfield : Roses, Carnations, &c.
W. Meyer, Esq., Kew : *Aquilegia hybrida.*
P. Murray-Thompson, Esq., Mealsgate : Primroses.
W. North Row, Esq., Tiverton : *Gardenia* from Pondoland East.
Messrs. Paul, Cheshunt : *Cupressus Lawsoniana Westermanni.*
Messrs. Rogers, Basset : *Pelargonium* 'J. T. Hamilton.'
Mr. L. R. Russell, Richmond : *Cytisus Andreanus prostratus.*
L. Sutton, Esq., Reading : *Calceolaria profusa.*
Messrs. R. Sydenham, Birmingham : Sweet Peas.

Messrs. Veitch, Chelsea: *Philadelphus* 'Banniere' and *Aristolochia heterophylla.*

Messrs. Whitelegg and Page, Chislehurst: alpines.

Miss Willmott, Warley: *Cheiranthus Allioni hybrida.*

FLORAL COMMITTEE, TEMPLE SHOW, MAY 25, 26, 27, 1909.

Mr. WM. MARSHALL, V.M.H., in the chair, and twenty-four members present.

[For awards of cups and medals made by the Council after consultation with the Judges, see p. xciv].

Awards Recommended.

Award of Merit.

To *Begonia* 'Pink Pearl' (votes, unanimous), from Messrs. Blackmore and Langdon, Bath. A very compact and free-flowering variety, with flowers of good form, 4 inches across, salmon-pink, and of good substance.

To Carnation 'Carola' (votes unanimous), from Mr. E. Engelmann, Saffron Walden. Flowers large, rather flat. Petals somewhat crowded in centre but loose towards the outside, coarsely indented. It is slightly clove scented, and of a beautiful deep crimson. Calyx good, and flowers borne on stout, rigid stems.

To *Iris* 'Sir Dighton Probyn' (votes, 11 for, 1 against), from Mr. Amos Perry, Enfield. A hybrid raised by the late Sir Michael Foster from *I. iberica* × *I. pallida.* Leaves ensiform, 18 inches high at flowering time. Stem 2 feet high, 2 or 3 flowered. Falls 3 inches long and 2 inches wide, broadly spathulate, purple, shading off paler towards the haft, and lined with deep purple. Beard broader than in *pallida*, orange, ending in a signal patch of purple. Standards 3¼ inches long and 2½ inches broad, orbicular, narrowing gradually to the slender claw, mauve, lined at edge, and shaded on sides of claw with brownish purple. Style arms 2 inches long, ¾ inch wide, pale purple, tinged with brown.

To *Iris* 'Sir Trevor Lawrence' (votes, 10 for, 3 against), from Mr. A Perry, Enfield. Another of the late Sir Michael Foster's hybrids, with the same parentage as the foregoing. Standards, 3 inches long and broad, narrowing suddenly to the claw, mauve, faintly lined at the edge with pale purple. Falls 3 inches long and 2 inches broad, mauve, slightly darker than standards, tinged and lined purple near haft. Beard broad, yellow. Style arms mauve, tinged rose. Spathe valves scarious as in *I. pallida.*

To *Ficus australis variegata* (votes, 6 for, 1 against), from Messrs. Sander, St. Albans. The plants exhibited were about 9 inches high. Leaves narrowly ovate, 4 inches long, creamy yellow, with an irregular zone of green about the midrib.

To Marguerite 'White Perfection' (votes, 7 for, 1 against), from Messrs. Clark, Dover. A white sport from 'Queen Alexandra,' having flat flower heads 3½ inches in diameter, with a sulphur centre. Vigorous and free flowering, the flowers lasting for a considerable time.

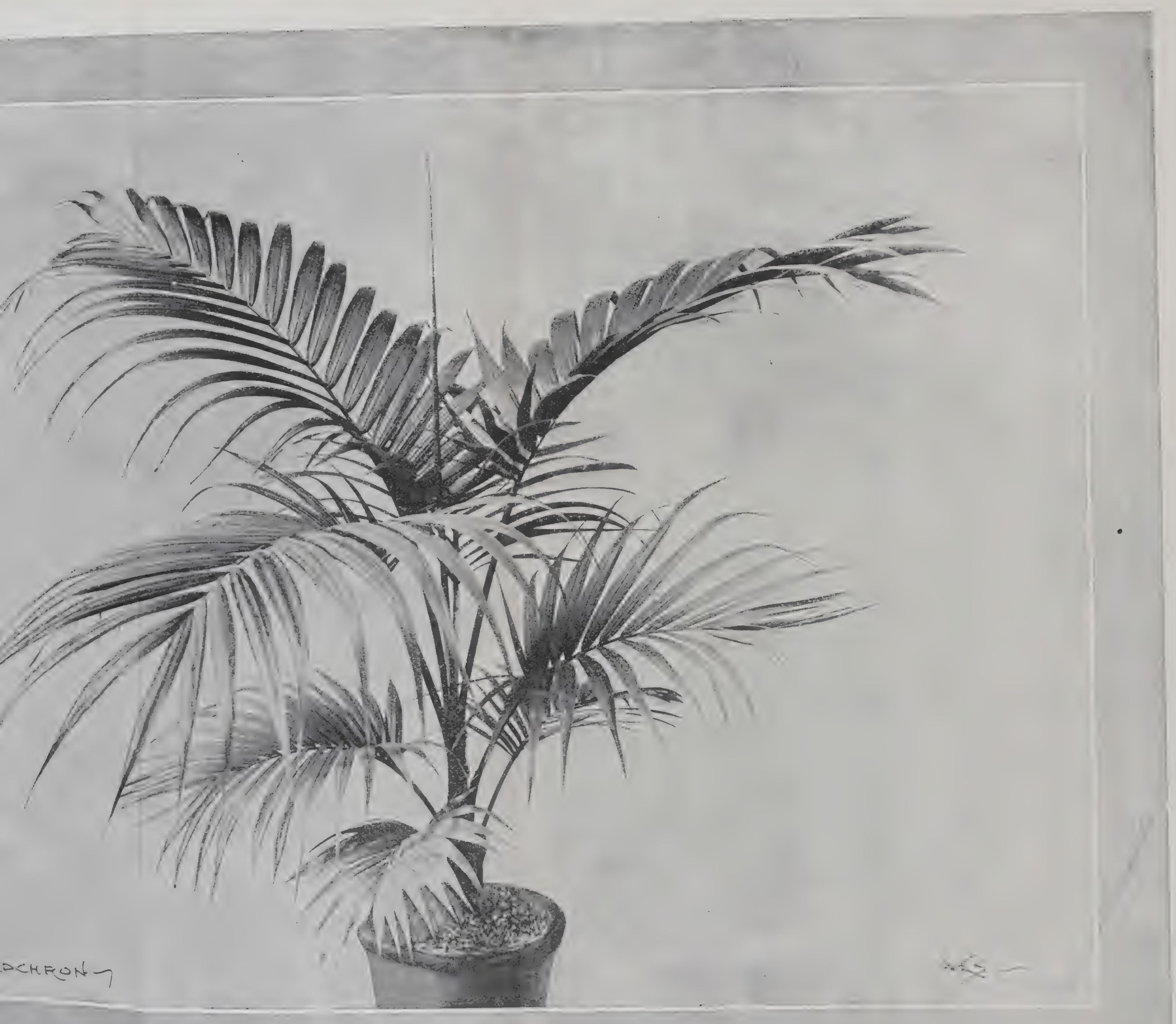


Fig. 90. Ptychoraphis Siebertiana. (*Gardeners' Chronicle.*) (p. cxxxix.)

(*To face page* cxxxix.)

To *Ptychoraphis Siebertiana* (votes, 9 for, 1 against), from Messrs. Sander, St. Albans. A graceful palm, with long, arching pinnate leaves; pinnules spreading except lower pair of each leaf, which are erect. Leaves deep holly green, and leaf-stalks tinged with red at base. (Fig. 90.)

To Rose 'American Pillar' (votes, unanimous), from Messrs. Cannell, Swanley. Flowers single, 2 inches diameter, borne in large, graceful clusters. The centre of the flower is white, gradually shading off to a bright rosy pink.

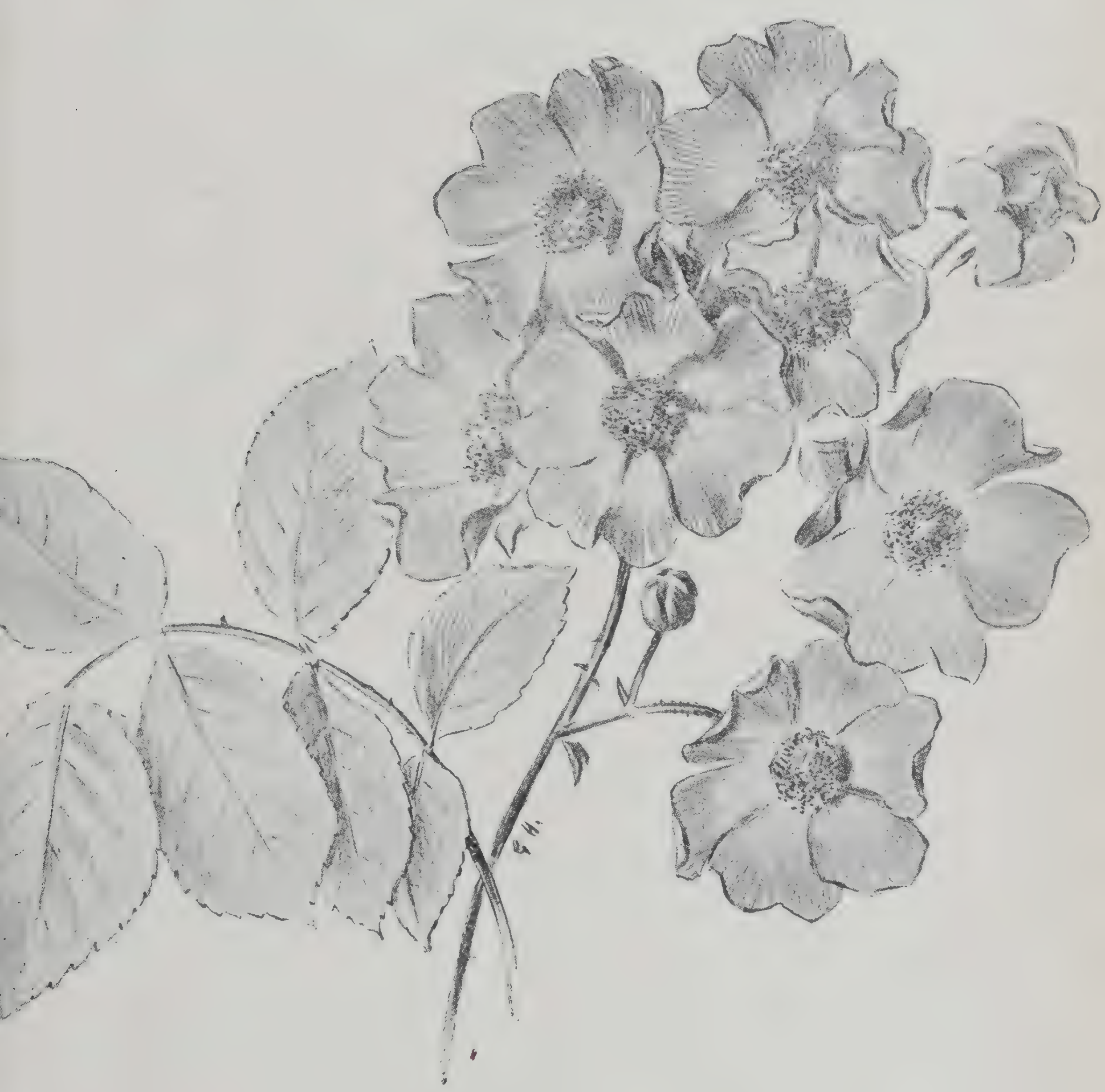


Fig. 91.—Rose 'Coquina.' (*The Garden.*)

To Rose 'Coquina' (votes, 9 for, 1 against), from Messrs. Wm. Paul, Waltham Cross, and Hobbies, Dereham. A very free-flowering, bright rosy-pink rambler, producing large drooping clusters of small flowers. A plant which had been over-forced had nearly white flowers. (Fig. 91.)

To Rose 'Jessie' (votes, unanimous), from Messrs. Merryweather, Southwell. A dwarf Polyantha variety, with semi-double flowers of a beautiful crimson carmine. Very free, and the flowering period is a long one.

To Rose 'Margaret' (votes, 8 for, 2 against), from Messrs. Wm. Paul, Waltham Cross. A beautiful Hybrid Tea, useful for exhibition and garden decoration. Flowers of good form, pale pink, deepening towards the centre; faintly scented. Growth vigorous.

To Rose 'Mrs. Taft' (votes, 6 for, 2 against), from Messrs. H. Low, Enfield. A beautiful lilac-rose Polyantha variety. Flowers double, freely produced on erect, much-branched stems, about 1 inch diameter. A very early and vigorous variety.

Other Exhibits.

Messrs. F. Cant, Colchester: Roses.
Messrs. A. Dickson, Newtownards: Roses.
Hon. V. Gibbs, Elstree: Streptocarpus.
Messrs. Jarman, Chard: Sweet Peas and Carnations.
Messrs. H. B. May, Upper Edmonton: Ferns.
Mr. W. H. Page, Hampton: Roses and Pelargonium 'Irene Page.'
W. P. Pierce, Esq., Canterbury: White Iris.
Messrs. Storrie, Glencarse: Primulas.
Messrs. J. Veitch, Chelsea: *Andromeda speciosa*, Primulas, and Pelargonium 'Snow Queen.'

FLORAL COMMITTEE, JUNE 8, 1909.

Mr. WM. MARSHALL, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Cutbush, Highgate, for Carnations.
To Mr. W. H. Page, Hampton, for Carnations, Pelargoniums, &c.
To Messrs. J. Veitch, Chelsea, for hardy plants and Gloxinias.

Silver-gilt Banksian Medal.

To E. J. Johnstone, Esq., Groombridge, for Sweet Peas.

Silver Flora Medal.

To Messrs. Cannell, Swanley, for Cannas.
To Messrs. Carter, Holborn, for Gloxinias.
To Messrs. Dobbie, Rothesay, for Aquilegias.
To Miss Hemus, Upton-on-Severn, for Sweet Peas.
To Messrs. S. Low, Enfield, for Carnations, &c.
To Messrs. May, Upper Edmonton, for Ferns and flowering plants.
To Messrs. Mount, Canterbury, for Roses.
To Mr. A. Perry, Enfield, for herbaceous plants.
To Messrs. Wallace, Colchester, for herbaceous plants.
To Mr. H. Burnett, Guernsey, for Carnations.

Silver Banksian Medal.

To Messrs. Barr, Surbiton, for herbaceous plants.
To Messrs. Bunyard, Maidstone, for herbaceous plants.
To Messrs. Cheal, Crawley, for Lupines and shrubs.
To Mr. A. Ll. Gwillim, New Eltham, for Begonias.
To Mr. Prichard, Christchurch, for hardy plants.
To Mr. Reuthe, Keston, for hardy plants.
To Messrs. Ware, Feltham, for hardy plants.
To Messrs. Clark, Dover, for Pyrethrums.
To Mr. Prince, Oxford, for Roses.

Bronze Flora Medal.

To Mr. C. F. Waters, Balcombe, for Carnations.

Bronze Banksian Medal.

To Messrs. B. Cant, Colchester, for Roses.

Award of Merit.

To *Geum coccineum* 'Mrs. J. Bradshaw' (votes, 7 for), from Messrs. Clark, Dover. Flowers larger than the type, and inclined to doubling. Of the same dazzling scarlet colour.

To *Lithospermum prostratum* 'Heavenly Blue' (votes, 15 for), from Mr. A. Perry, Enfield. A pale-blue form, of better habit than the type. It is a much more abundant bloomer, and will grow well in a soil containing lime. The corolla tube is tinged with purple.

To Sweet Pea 'Paradise Apple Blossom' (votes, unanimous), from Miss H. Hemus, Upton-on-Severn. Flowers borne three or four on a stem. Standard and wings much waved, white, edged rose, more heavily on standard than on wings.

To Aquilegia, long spurred strain (votes, unanimous), from Messrs. Dobbie, Rothesay. A beautiful strain, including many colours pleasingly combined. Flowers of good form, with very long spurs, and borne erect on wiry stems.

To Iris 'Edward Michel' (votes, 6 for, 3 against), from Messrs. Wallace, Colchester. The result of crossing *I. pallida* with *I. germanica* 'Amas.' Standards 3 inches long, 2 inches broad, orbicular, narrowing suddenly to the claw, purplish mauve, spotted and veined round claw with pale purplish brown, and tinged green; falls 3½ inches long, 2 inches broad, rather deeper in colour than standards; haft creamy white, veined and spotted purplish brown; beard yellow. Style branches 1½ inch long, 1 inch broad, pale mauve, tinged purple along the centre. (Fig. 92.)

To *Scolopendrium vulgare crispum multifidum* (votes, 9 for), from Messrs. May, Upper Edmonton. A curious form, with undulate leaves, very heavily crested.

To *Scolopendrium vulgare crispum muricato-fimbriatum* (votes, unanimous), from Messrs. May, Upper Edmonton. Leaves undulate, densely fimbriated, muricate near midrib on upper surface. (Fig. 93.)

To *Schizanthus* 'Beauty of Trent' (strain), (votes, 11 for, 1 against), from Mr. H. Parr, New Barnet. Flowers large, rosy scarlet, with large yellow blotch on upper petal. A variety very much like *Schizanthus retusus* but larger.

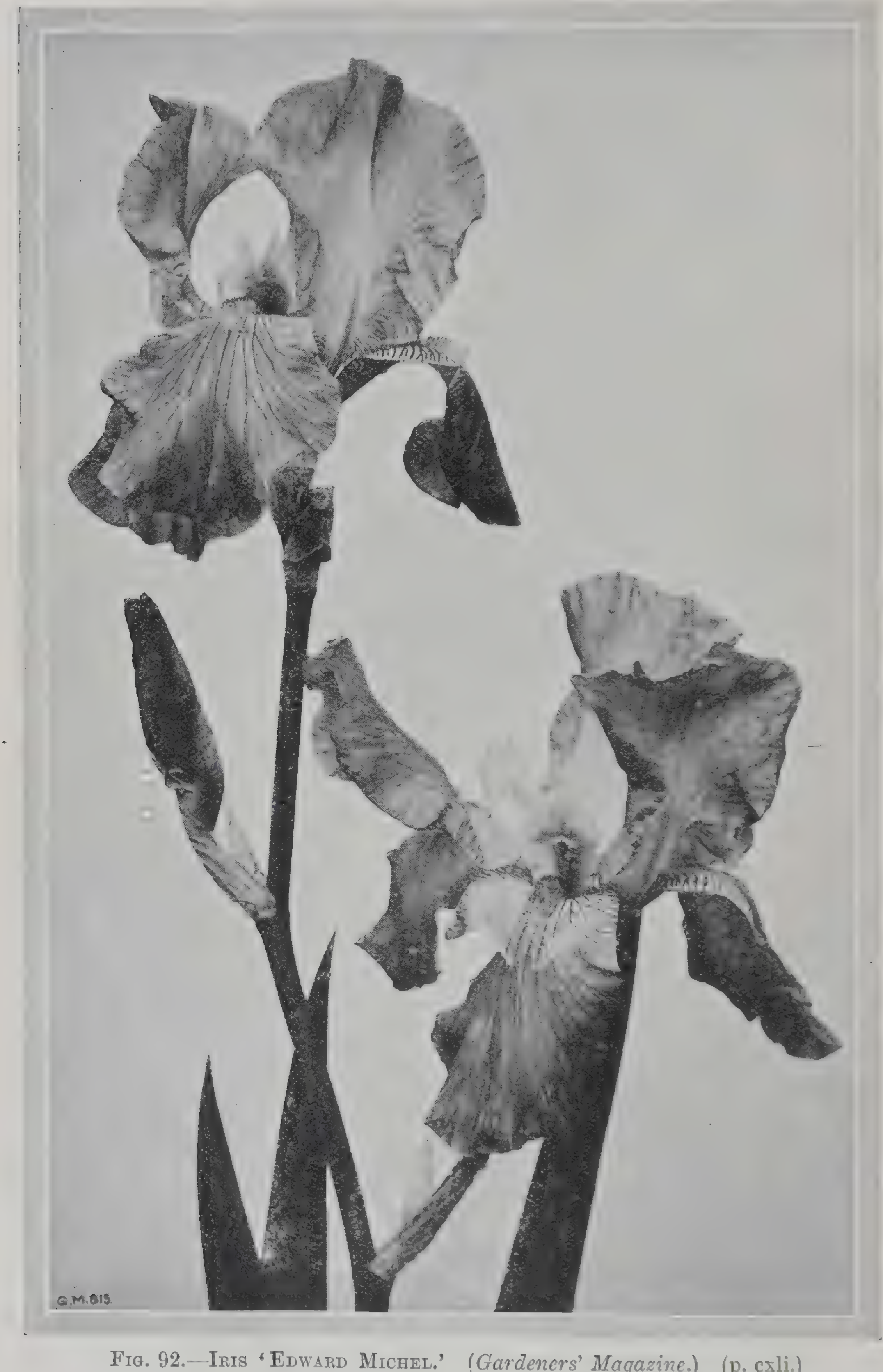


FIG. 92.—IRIS 'EDWARD MICHEL.' (*Gardeners' Magazine.*) (p. cxli.)

To *Araucaria excelsa* 'Silver Star' (votes, 11 for, 3 against), from Messrs. Rochford, Turnford, Broxbourne. A form of the well-known

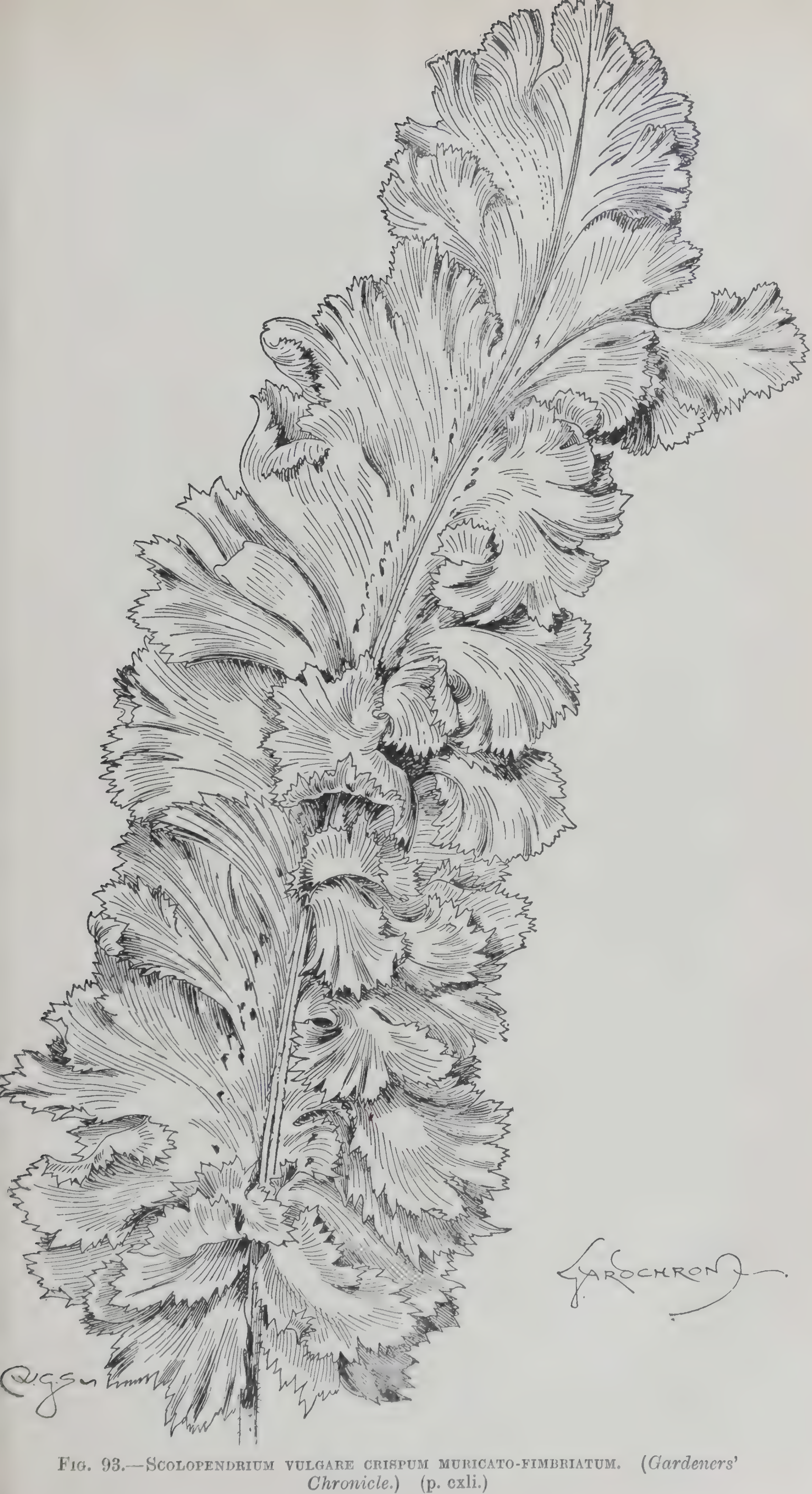


Fig. 93.—Scolopendrium vulgare crispum muricato-fimbriatum. (*Gardeners' Chronicle.*) (p. cxli.)

A. excelsa, having white tips to its branchlets. The white tips form quite a regular zone on each side of the flat branches, giving the plant a very curious appearance.

To *Polypodium glaucum crispum* (votes, 15 for), from Messrs. Rochford, Turnford Hall. It is a sport from *P. glaucum*, and has very much the appearance of *P. glaucum Mayi*, except that the leaves are much more densely undulated. It has large, glaucous leaves, and appears to be very vigorous.

Other Exhibits.

Messrs. Bakers, Wolverhampton : Aquilegias, &c.
Messrs. Carter Page, London Wall, E.C. : Dahlias and Violas.
Messrs. Clibrans, Altrincham : *Calceolaria Clibranii.*
Miss Dixon, Chichester : Ixias.
Mr. J. Douglas, V.M.H., Bookham : hybrid Dianthus.
C. Elliot, Esq., Stevenage, Herts : alpines.
Messrs. Evans, Llanishen, Cardiff : hardy plants.
A. E. Franklin, Esq., Chesham : Carnation, 'A. E. Franklin.'
Mr. W. J. Godfrey, Exmouth : Oriental Poppies, &c.
Guildford Hardy Plant Nursery : hardy plants.
Mr. A. J. Harwood, Colchester : hardy plants.
Misses Hopkins, Shepperton : hardy plants.
Messrs. Jackman, Woking : hardy plants.
Messrs. Kelway, Langport : herbaceous plants.
A. Malcolm, Esq., Town House, Duns : Sweet Peas.
Messrs. G. Paul, Cheshunt : Roses and Rhododendrons.
Messrs. Wm. Paul, Waltham Cross : Roses.
Mr. L. R. Russell, Richmond : *Zenobia speciosa.*
Mr. C. Turner, Slough : seedling Poppies.
T. Weller-Poley, Esq., Chichester : *Begonia Brunillii.*

FLORAL COMMITTEE, JUNE 22, 1909.

MR. WM. MARSHALL, V.M.H., in the Chair, and thirty members present

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs Bunyard, Maidstone, for herbaceous plants.

To Messrs. May, Upper Edmonton, for *Nephrolepis* and flowering plants.

Silver-gilt Banksian Medal.

To Messrs. Cutbush, Highgate, for herbaceous plants.

To Messrs. Veitch, Chelsea, for greenhouse plants, annuals, &c.

To Messrs. Ware, Feltham, for alpines, &c.

Silver Flora Medal.

To Messrs. Bath, Wisbech, for Paeonies.

To Messrs. Cannell, Swanley, for Aquilegias.

To Messrs. F. Cant, Colchester, for Roses.

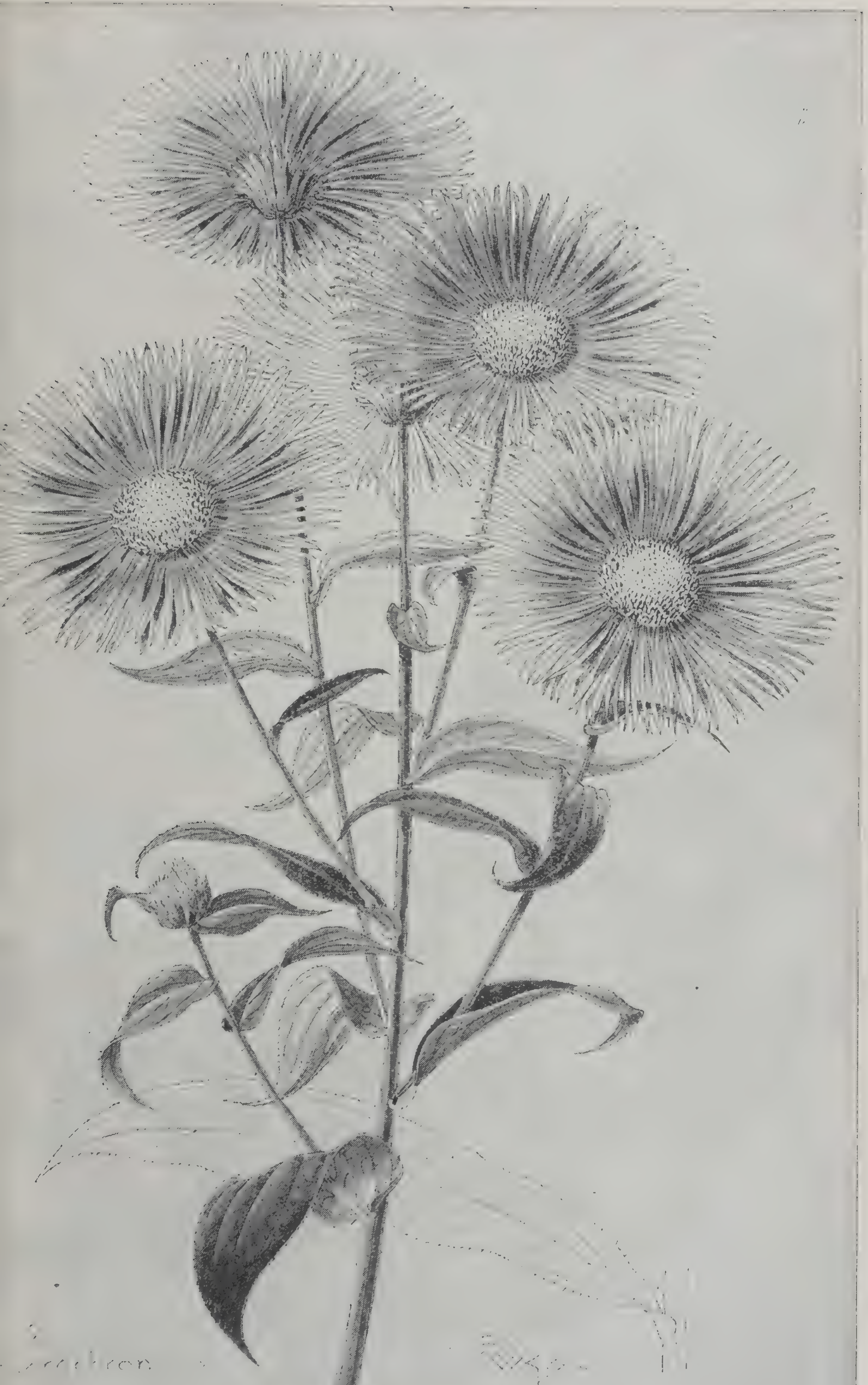


Fig. 94.—Erigeron macranthus var. (*Gardeners' Chronicle.*) (p. cxlvi.)

To Messrs. Clark, Dover, for hardy plants.
To Messrs. Kelway, Langport, for Paeonies.
To Messrs. G. Paul, Cheshunt, for Paeonies and Roses.
To Mr. A. Perry, Enfield, for herbaceous plants.

Silver Banksian Medal.

To Mr. H. Burnett, Guernsey, for Carnations.
To Messrs. B. Cant, Colchester, for Roses.
To Messrs. Jackman, Woking, for hardy plants.
To Messrs. E. W. King, Coggeshall, for Sweet Peas.
To Mr. R. C. Notcutt, Woodbridge, for hardy plants.
To Hon. V. Gibbs, Elstree, for Pelargoniums.
To Mr. M. Prichard, Christchurch, for Paeonies.
To Mr. G. Reuthe, Keston, for hardy plants.
To Mr. W. Unwin, Histon, for Sweet Peas.
To Sir E. Loder, Bart., Horsham, for rare hardy plants.

Bronze Banksian Medal.

To Messrs. Bakers, Wolverhampton, for Aquilegias.

Award of Merit.

To *Erigeron macranthus* var. exhibited under the name *Aster Mesa grandiflora* (votes, 17 for), from Messrs. Cutbush, Highgate. Flowers 1¾ inch in diameter. Ray florets narrow; of a soft lavender-blue colour; disc yellow, tinged towards centre with green. The plant grows to a height of 2½ feet, and is very free-flowering. (Fig. 94.)

To *Campanula phyctidocalyx* (votes, 16 for), from Sir Trevor Lawrence, Bart., V.M.H., Burford. Flowers disposed in loose panicles; pedicels 2 inches or more long, each bearing a single, broadly campanulate, blue flower; style branches deep purple; the ovary is covered with small transparent warts when the flower is open, but in the bud this character is not so marked. This plant is said to be taller than *C. amabilis*, but otherwise the two plants are identical.

To *Delphinium* × *Moerheimi* (votes, 16 for), from Messrs. Cutbush, Highgate. Inflorescence loose; flowers borne on pedicels 2½ inches long, pure white, tinged with blue on upper petal and bearded yellow on two lower ones; 1½ inch in diameter, with greenish-white spur ¾ inch long. Raised by crossing *D. chinense* with pollen from *D. Belladonna*. The plant reaches a height of 4 feet, and is much more vigorous than most white varieties.

To *Paeonia* 'Leonora' (votes, 14 for), from Mr. C. Turner, Slough. A large, bright crimson, single variety; staminodes narrow, dull yellow, tinged with red; flowers borne on stout stiff stems. (Fig. 95.)

To *Paeonia* 'Queen of Singles' (votes, 17 for), from Mr. C. Turner, Slough. Flowers slightly larger than the foregoing, pure white, tinged in places with pale rose; staminodes very bright yellow, showing up against the white petals. The stems are stiff and erect, and the flower sweetly scented.

To Picotee 'Her Majesty' (votes, 14 for, 7 against), from Mr. Chas. Blick, Warren Nursery, Hayes. A yellow ground Picotee, heavily edged

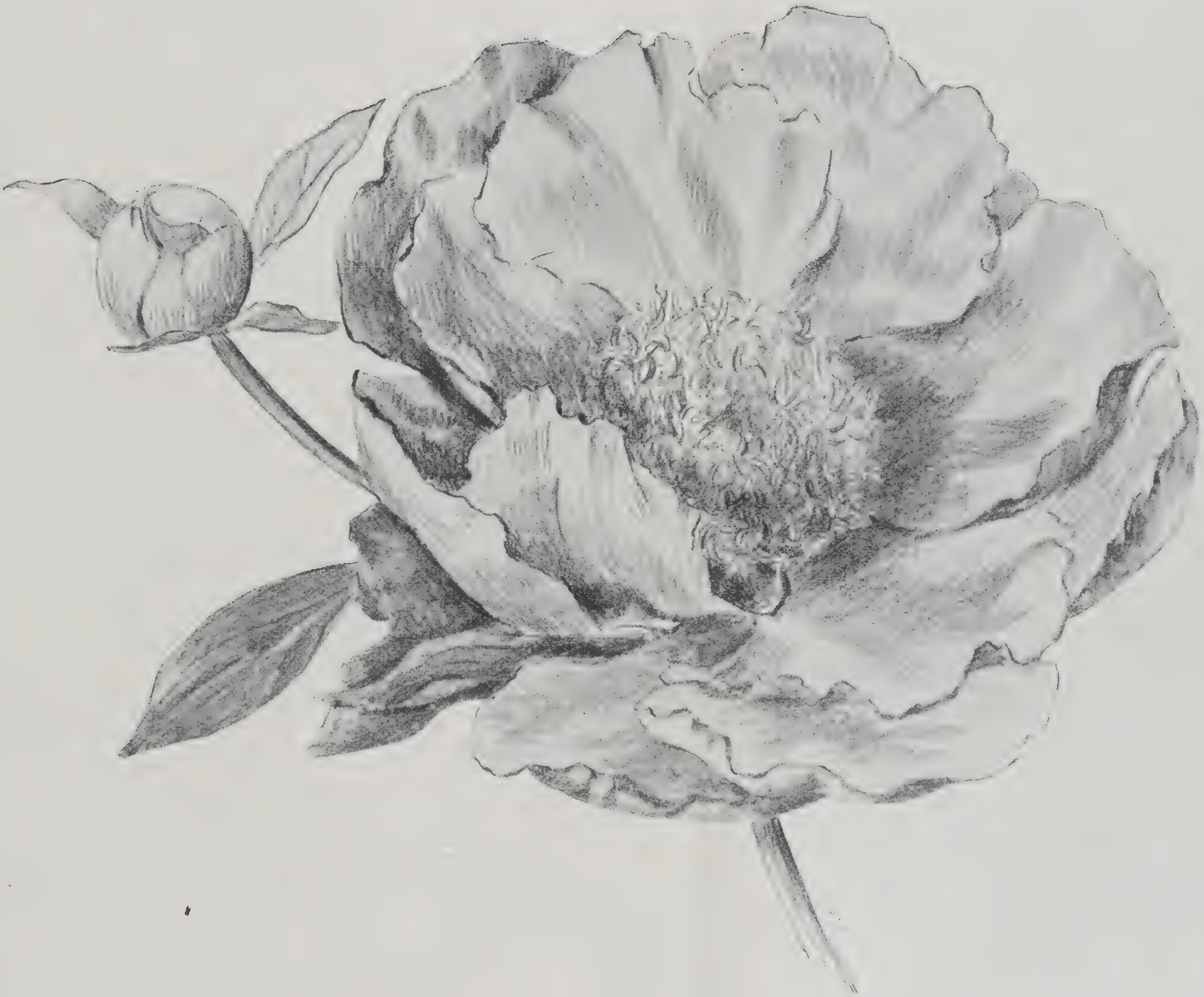


Fig. 95.—Paeonia 'Leonora.' (*The Garden.*) (p. cxlvi.)

(*To face page* cxlvi.)

with crimson carmine; flowers rather flat, but perfectly circular; petals entire, broad, of good substance. Stem erect, stiff, calyx perfect, and flowers slightly clove-scented.

To Sweet Pea 'Blanche Stevens' (votes, 17 for, 2 against), from Mr. H. J. Jones, Lewisham. Flowers large, three on a stem, pure white; stems long, stout and rigid.

To Sweet Pea 'Stirling Stent' (votes, unanimous), from Mr. J. Agate, Havant. A scarlet variety, with flowers averaging three to a stem; standard large, broad, and of good substance; keel white tinged rose. An exceptionally sweet-scented variety.

Other Exhibits.

Messrs. Barr, Covent Garden: hardy plants.
Messrs. Bonny, Blackpool: variegated Antirrhinums
Messrs. W. Bull, Chelsea: Spanish Irises.
F. M. Burton, Esq., Gainsborough: *Iris germanica* 'Meteor.'
Messrs. Cheal, Crawley: hardy plants.
Mr. H. H. Crane, Highgate: Violas.
Mr. J. Douglas, V.M.H., Great Bookham: Pink.
Mr. C. Elliot, Stevenage: rock garden.
Mr. Fabius, Emsworth: Carnations.
Guildford Hardy Plant Nursery: hardy plants.
Mr. A. J. Harwcod, Colchester: hardy plants.
Misses Hopkins, Shepperton: alpines.
Mrs. Lloyd Edwards, Llangollen: hybrid Heucheras.
Messrs. S. Low, Enfield: Pink 'Gloriosa,' and Roses.
Messrs. Mawson, Windermere: Oriental Poppies.
Messrs. Peed, Streatham: hardy plants.
Redlands Co., Emsworth: Carnation 'Stirling Stent.'
Mrs. Scott Elliot, Hawick: Aquilegias.
Mr. C. Turner, Slough: Paeonies.
Mr. J. Vert, Saffron Walden: *Begonia* 'Audley End White.'

FLORAL COMMITTEE, JULY 8, 1909, AT HOLLAND PARK.

For Cups and Medals awarded by the Council, see page ci.

Mr. WM. MARSHALL, V.M.H., in the Chair, and twenty-three members present.

Awards Recommended.

First-class Certificate.

To *Primula Littoniana* (votes, unanimous), from Messrs. Bees, Liverpool. A beautiful species found by Mr. Forrest in Yunnan, at an altitude of 11,000 to 12,000 feet. The inflorescence is 15 inches high, and the numerous flowers are crowded together at the top, into a spike about 3 to 4 inches long. Calyx somewhat inflated, mealy, coloured brick red, especially when exposed to the sun. Corolla light-bluish violet, slightly mealy round tube, nearly $\frac{1}{2}$ inch across when flattened out, but normally the narrowly-ovate petals do not spread. Leaves 8 inches long, and narrow. The plant has proved quite hardy in Britain, and, unlike most Chinese Primulas, likes a sunny position. (Fig. 96.)

Award of Merit.

To Carnation 'Lieutenant Shackleton' (votes, 10 for, 4 against), from Mr. C. Blick, Warren Nursery, Hayes. A large border variety of good constitution. The ground colour is apricot, shading to pale rose at the edge of the petals, and lightly flaked rosy scarlet.

To *Delphinium* 'White Queen' (votes, unanimous), from Messrs. Wallace, Colchester. A tall, robust, double variety, with dense spikes of bloom 2 feet long. Flowers 1½ inch across, of a soft creamy white colour.

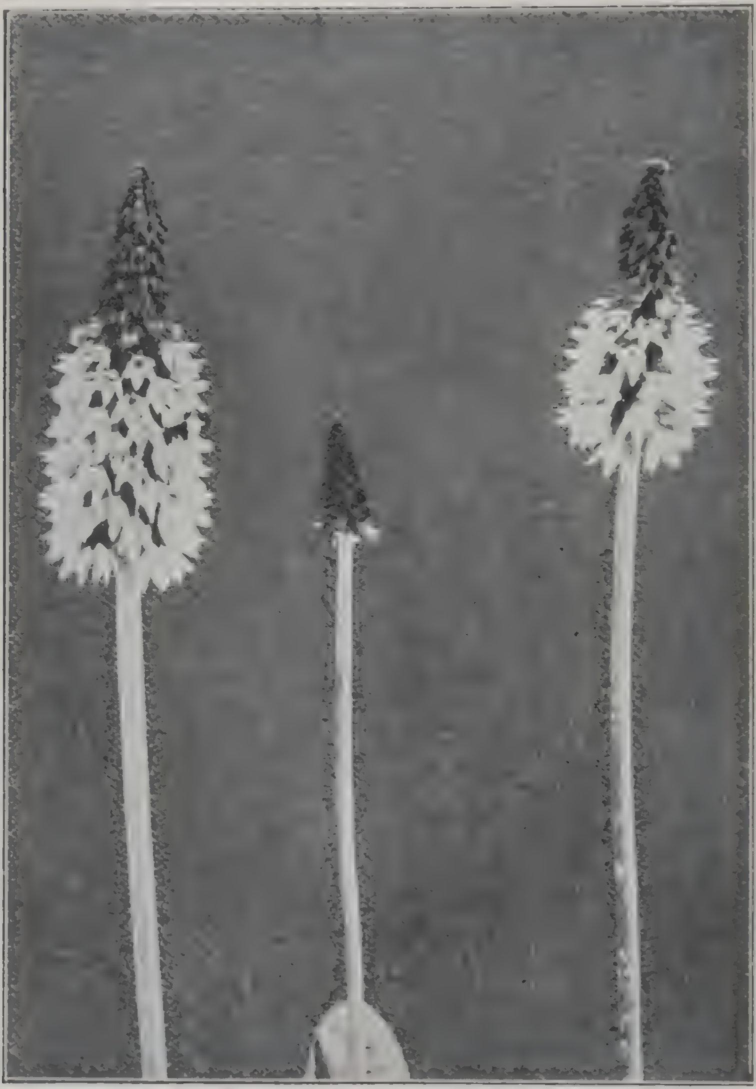


FIG. 96.—PRIMULA LITTONIANA. (*Bees.*) (p. cxlvii.)

To *Nephrolepis magnifica* (votes, unanimous), from Messrs. Stuart Low, Enfield. A variety very near *N. Amerpohlii*, but the pinnæ are more finely cut, and the whole plant has a lighter appearance.

To Rose 'Ariel' (votes, 13 for, 4 against), from Messrs. Paul, Cheshunt. A single rambler with flowers 4 inches across, rosy pink tinged with lemon yellow in centre. Foliage bright, shining green. It is a good grower and free flowering, and is a cross between 'Tea Rambler' and 'Jersey Beauty.'

To Rose 'Duchess of Wellington' (votes, unanimous), from Messrs. A. Dickson, Newtownards. Flowers of excellent form, rich chrome yellow, shading to orange inside. Outside petals flaked red. A very beautiful Hybrid Tea variety, with an exceedingly sweet scent.

To Rose 'Grace Molyneux' (votes, unanimous), from Messrs. A. Dickson, Newtownards. A large Hybrid Tea with well-formed buds, but the flower is rather loose when open. Flowers creamy white, shading to pale rose in the depths of the flower.

To Rose 'Walter Speed' (votes, unanimous), from Messrs. A. Dickson, Newtownards. Flowers large, very full, white, tinged inside pale cream. The flowers are of good form, which they retain for a long period after opening, and are sweet-scented.

To Sweet Pea 'Colleen' (votes, unanimous), from Mr. W. Deal, Kelvedon. Flowers borne in threes. Standard rose, tinged scarlet in front, and veined deep rose. Wings and keel white, delicately tinged palest rose.

To Sweet Pea 'Doris Usher' (votes, unanimous), from Sir R. Baker, Bart., Reading. Flowers borne in threes and fours on long stout stems. Standard and wings much waved and of good substance. Standard rose, and wings a shade paler.

To Sweet Pea 'Masterpiece' (votes, 9 for, 1 against), from Messrs. Dobbie, Rothesay. Flowers large, borne in threes on good stems. Colour lavender, shading to blue at base of petals, which are slightly waved.

To Sweet Pea 'Mrs. Henry Bell improved' (votes, 13 for), from Messrs. Dobbie, Rothesay. Flowers large and well-formed. Pale rosy pink shading to apricot at base of standard, and tinged with a deeper pink at edges. The flowers are borne in threes, and the standards are waved.

To Sweet Pea 'Mrs. Townsend' (votes, 14 for, 1 against), from Messrs. Jarman, Chard. Flowers borne in fours, much waved, white tinged on reverse with pale purplish blue, and finely veined on centre of standard with deep blue.

Cultural Commendation.

To J. Friedlander, Esq., Reading, for well-grown Fuchsias.

Other Exhibits.

Messrs. Artindale, Sheffield: *Silene laciniata Purpusii.*
Messrs. Backhouse, York: Carnation 'Queen of Spain.'
Messrs. Bath, Wisbech: Carnation 'Doreen.'
Messrs. Bide, Farnham: Roses.
Messrs. Blackmore and Langdon, Bath: Begonias.
Mr. C. W. Breadmore, Winchester: Sweet Peas.
Messrs. G. A. Bunting, W.C.: Sweet Peas.
Messrs. Clark, Dover: Sweet Peas, &c.
Mr. W. Deal, Kelvedon: Sweet Peas.
Messrs. Dobbie, Rothesay: Sweet William 'Emperor.'
Messrs. Dickson, Newtownards: Roses.
G. Ferguson, Esq., Weybridge: Delphiniums.
Messrs. Gibson, Bedale: Delphiniums.
Mr. A. Ll. Gwillim, New Eltham: Begonias.

Messrs. Jarman, Chard: Sweet Peas.
Messrs. Kelway, Langport: Sweet Peas, Paeonies, &c.
Mr. F. Lilley, St. Peter's, Guernsey: Gladioli.
Philip le Cornu, Esq., Jersey: Rose 'Mrs. P. le Cornu.'
Messrs. S. Low, Enfield: Carnations.
Mrs. Newland, Chichester: Pink 'Mrs. Newland.'
Mr. W. H. Page, Hampton: Lilies.
Messrs. Peed, Streatham: Carnation.
Mr. M. Prichard, Christchurch: *Trollius chinensis.*
Mr. L. R. Russell, Richmond: Caladium.
Messrs. Stark, Gt. Ryburgh: Sweet Peas.
Mr. C. Turner, Slough: Rose 'Pink Rambler.'
Herr G. van Waveren, Holland: *Astilbe* 'Juliana.'
Messrs. T. S. Ware, Feltham: *Begonia* 'Thomas Rooney.'
Messrs. Wallace, Colchester: *Tritoma* 'Torchlight.'

FLORAL COMMITTEE, JULY 20, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended:—

Gold Medal.

To C. F. Raphael, Esq., Shenley, for Carnations.

Silver-gilt Flora Medal.

To G. Ferguson, Esq., Weybridge, for Delphiniums.
To Messrs. W. Paul, Waltham Cross, for Roses.

Silver-gilt Banksian Medal.

To Messrs. Carter, High Holborn, for Sweet Peas.
To Messrs. Cutbush, Highgate, for Carnations.
To Messrs. H. B. May, Edmonton, for ferns, &c.

Silver Flora Medal.

To Messrs. Cannell, Swanley, for Cacti.
To Messrs. Carter Page, London Wall, E.C., for Sweet Peas.
To Messrs. Stuart Low, Enfield, for Carnations and Roses.
To Mr. A. Perry, Enfield, for Delphiniums.
To Messrs. J. Veitch, Chelsea, for Carnations, Cannas, Celosias, &c.
To Messrs. Wallace, Colchester, for Lilies, &c.

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for herbaceous plants.
To Messrs. Clark, Dover, for herbaceous plants.
To Messrs. Cuthbert, Southgate, for Pelargoniums.
To Mr. F. Lilley, Guernsey, for early Gladioli.
To Mr. G. Reuthe, Keston, for hardy plants.

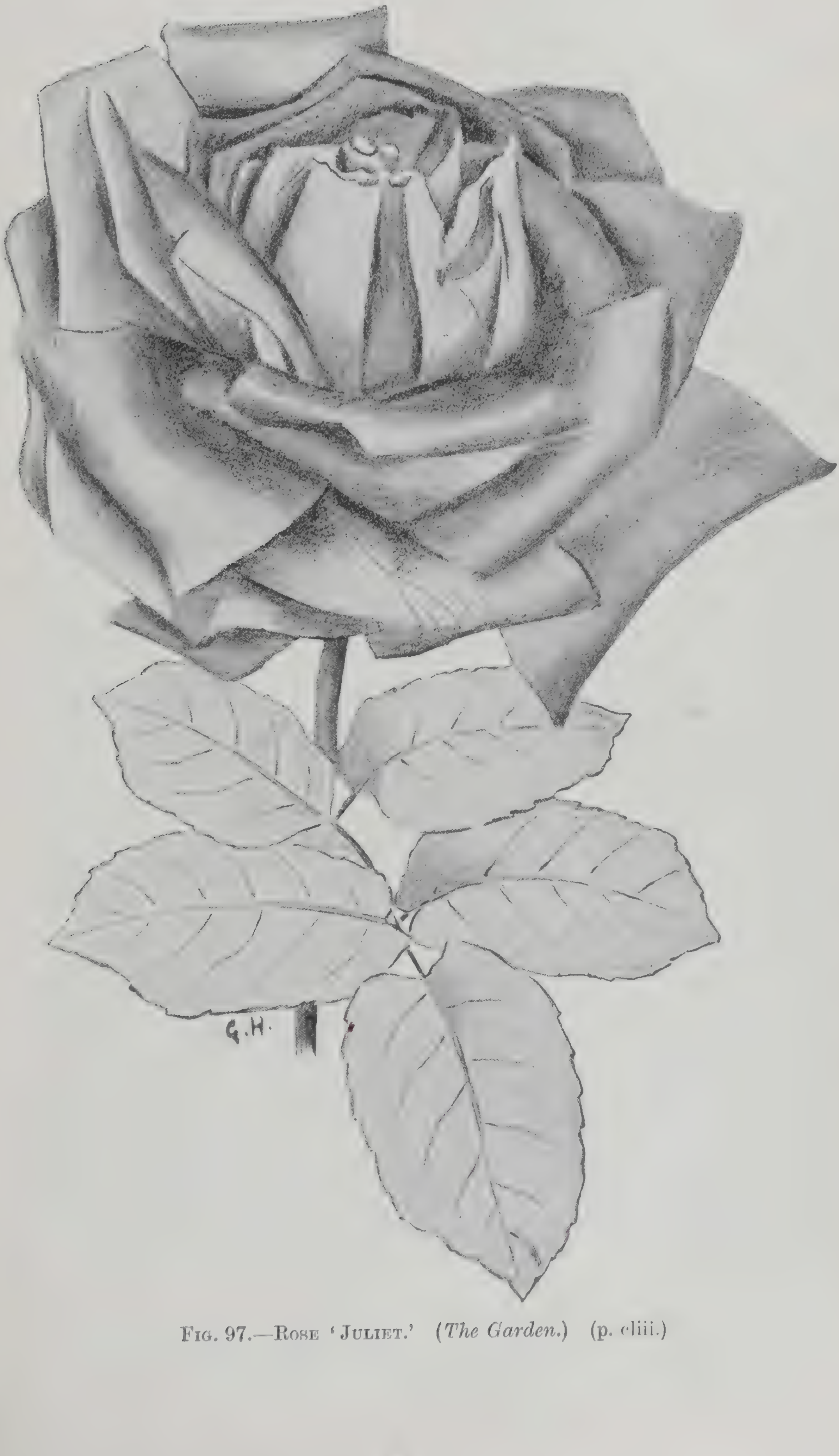


Fig. 97.—Rose 'Juliet.' (*The Garden.*) (p. cliii.)

Award of Merit.

To *Delphinium* 'Nulli Secundus' (votes, unanimous), from G. Ferguson, Esq., Weybridge. A tall vigorous variety, with spikes 18 inches long. Flowers large, creamy white, tinged at tips of petals with green, and having a black centre.

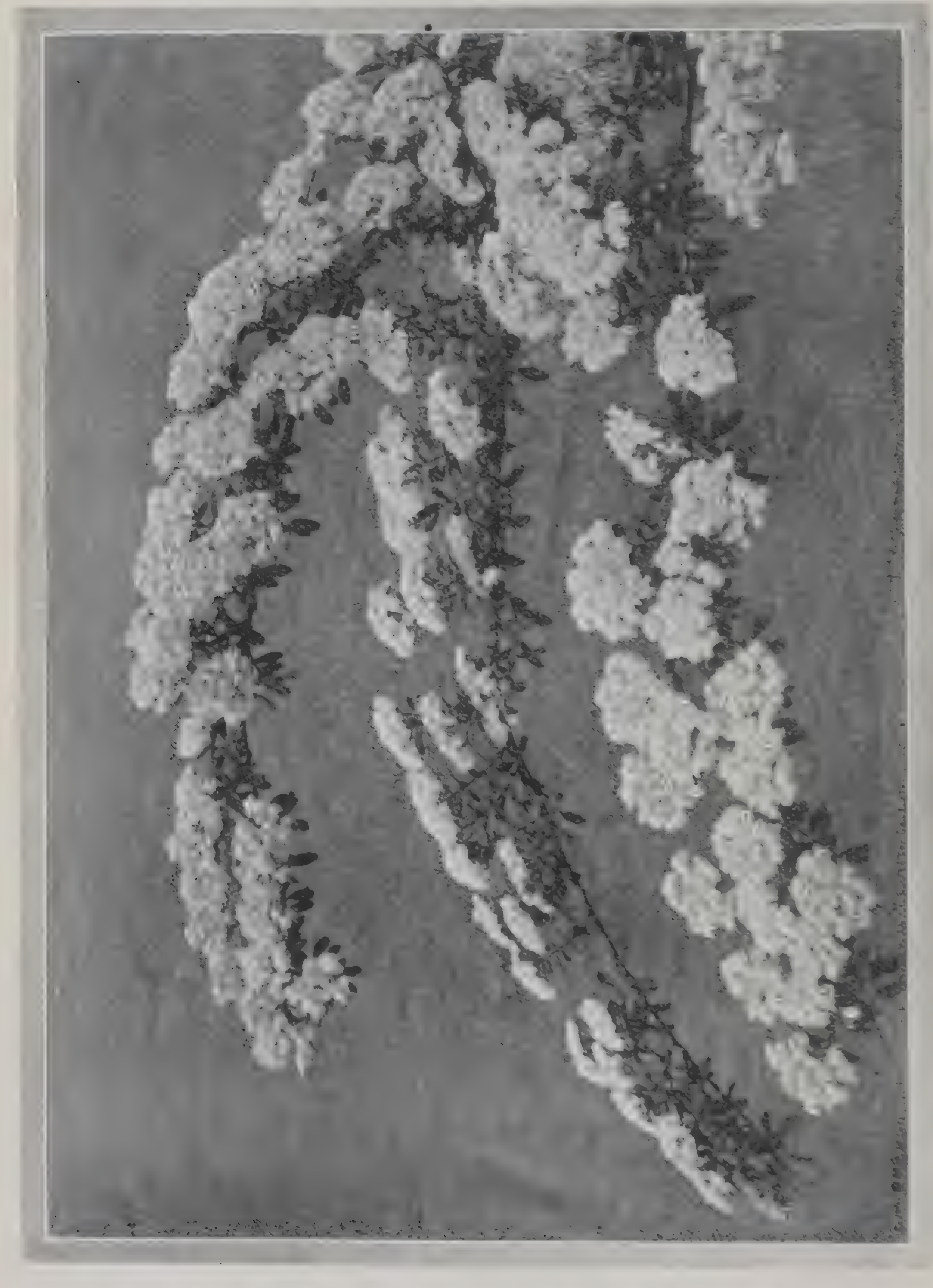


FIG. 98.—SPIRAEA VEITCHII. (*Gardeners' Magazine.*) (p. cliii.)

To *Eremurus* × 'Sir Michael' (votes, 13 for, 1 against), from Messrs. Wallace, Colchester. Spikes of flower 4 feet long. Flowers about 1 inch across, pale gamboge yellow, tinged green; buds just before opening are rose, but in younger state are green.

To *Nymphaea Mooreana* (votes unanimous), from Leopold de Rothschild, Esq., Gunnersbury Park (gr. Mr. J. Hudson, V.M.H.). A newly introduced Australian Water-lily, with primrose-yellow flowers, tinged rose at base of petals. Near *N. Marliacea chromatella*, but the petals are narrower.

To Rose (Hybrid Briar) 'Juliet' (votes, unanimous), from Messrs. W. Paul, Waltham Cross. The result of crossing 'Capt. Hayward' with 'Soleil d'Or.' Flowers of excellent form, very full, with a sweet scent; petals bright rosy scarlet, with cream yellow reverse, shading deeper towards the centre. (Fig. 97.)

To *Spiraea Veitchii* (votes, unanimous), from Messrs. J. Veitch, Chelsea. A newly introduced Chinese species, somewhat like *S. flagelliformis*. The numerous creamy-white flowers are borne on short lateral branches, growing from the upper side of long arching whip shoots. It is quite hardy, and forms a large shrub. (Fig. 98.)

Sweet Pea 'Edna Unwin' (votes, 7 for, 1 against), from Mr. W. J. Unwin, Histon, Cambs. Flowers borne in threes; standard scarlet tinged with rose; wings deep rose, slightly tinged with scarlet at edge.

Other Exhibits.

H. Aldersey, Chester: Sweet Peas.
Mr. E. Benary, Erfurt: *Lobelia Erforda.*
Messrs. Bull, Chelsea: foliage plants.
Mr. W. R. Chaplin, Waltham Cross: Roses.
Mr. W. Deal, Brooklands, Kelvedon: Sweet Peas and Candytuft.
Messrs. Dobbie, Marks Tey, Essex: Sweet Peas.
Mr. J. Douglas, V.M.H., Bookham: Carnations.
Lady Dyke, Lullingstone Castle, Kent: Sweet Peas.
Sir D. Gooch, Bart., Chelmsford: Carnations.
The Guildford Hardy Plant Nursery: hardy plants.
Messrs. R. Harkness, Hitchen: Roses.
Misses Hopkins, Shepperton: Sweet Williams.
Messrs. H. J. Jones, Lewisham: Phloxes.
Messrs. Kelway, Langport: Delphiniums, &c.
Mr. L. R. Russell, Richmond: Caladiums.
Mr. M. H. Sinclair, Aberdeen: Pelargoniums, and *Asparagus.*
Messrs. W. J. Unwin, Histon: Sweet Peas.
Messrs. Ward, Southgate: Pelargoniums.
Messrs. Ware, Feltham: alpines.

FLORAL COMMITTEE, JULY 29, 1909.

SUB-COMMITTEE AT WISLEY.

Mr. W. MARSHALL, V.M.H., in the Chair, and four members present.

The following were highly commended (**XXX.**), and ordered to be placed before the full committee on August 3.

Galega Hartlandii.
Lupinus hybridus atrococcineus (Carter).

Phlox 'Muriel Rogers' (Forbes).
Phlox 'Espoir' (Forbes).
Phlox 'Miss Lingard' (Chiswick).
Phlox 'Crœsus' (Chiswick).
Phlox 'Mme. M. Carvalho' (Chiswick).
Phlox 'Snow Queen' (Chiswick).

FLORAL COMMITTEE, AUGUST 3, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Kelway, Langport, for Gladioli.

To Leopold de Rothschild, Esq. (gr. Mr. J. Hudson, V.M.H.) Gunnersbury Park, Acton, for water plants.

Silver-gilt Banksian Medal.

To Mr. C. Blick, Warren Nursery, Hayes, for Carnations.

To Messrs. Bunyard, Maidstone, for hardy plants.

To Messrs. May, Upper Edmonton, for ferns and flowering plants.

To Mr. C. Turner, Slough, for Carnations and Spiraeas.

Silver Flora Medal.

To Mr. A. Perry, Enfield, for Spiraeas.

Silver Banksian Medal.

To Messrs. Cheal, Crawley, for hardy shrubs and Roses.

To Mr. J. Douglas, V.M.H., Bookham, for Carnations.

To Sir D. Gooch, Bart., Chelmsford, for Carnations.

To Messrs. R. Harkness, Hitchin, for Roses.

To Mr. G. Reuthe, Keston, for hardy plants.

Award of Merit.

To Carnation 'Elizabeth Shiffner' (votes, unanimous), from Mr. J. Douglas, V.M.H., Edenside, Great Bookham. Flowers of medium size, primrose yellow, tinged buff, especially in centre; calyx good; stems stiff, erect; strongly clove-scented.

To Carnation 'Fiery Furnace' (votes, 8 for), from Messrs. Blackmore and Langdon, Bath. Flowers of good form held erect on stiff stems, slightly scented; ground colour apricot, tinged red, flaked and tinged rich crimson.

To Carnation 'Jupiter' (votes, 10 for, 3 against), from Mr. C. Blick, Hayes, Kent. Ground colour apricot, heavily tinged lilac rose at edge of petals. Flowers of good form, but stems inclined to be weak.

To Carnation 'King of Spain' (votes, unanimous) from Mr. J. Douglas, V.M.H., Great Bookham. Flowers large, borne on long stiff stems; calyx good; ground colour rosy scarlet, flaked deep crimson maroon; clove-scented.

To *Galega officinalis* var. *Hartlandii* (votes, 12 for), from R.H.S. Gardens, Wisley. A large form of *G. officinalis* with racemes 6 inches to 7 inches in length. Wings and keel white tinged lilac; standard bluish lilac tinged at base with pale purple. A showy border plant, remaining in bloom for a very long period.

To *Gloxinia*, Veitch's 'Superb' strain (votes, unanimous), from Messrs. J. Veitch, Chelsea. Flowers large, of good substance, comprising many beautiful shades from deepest purple, through delicate blues and reds to white. Many edged and spotted.

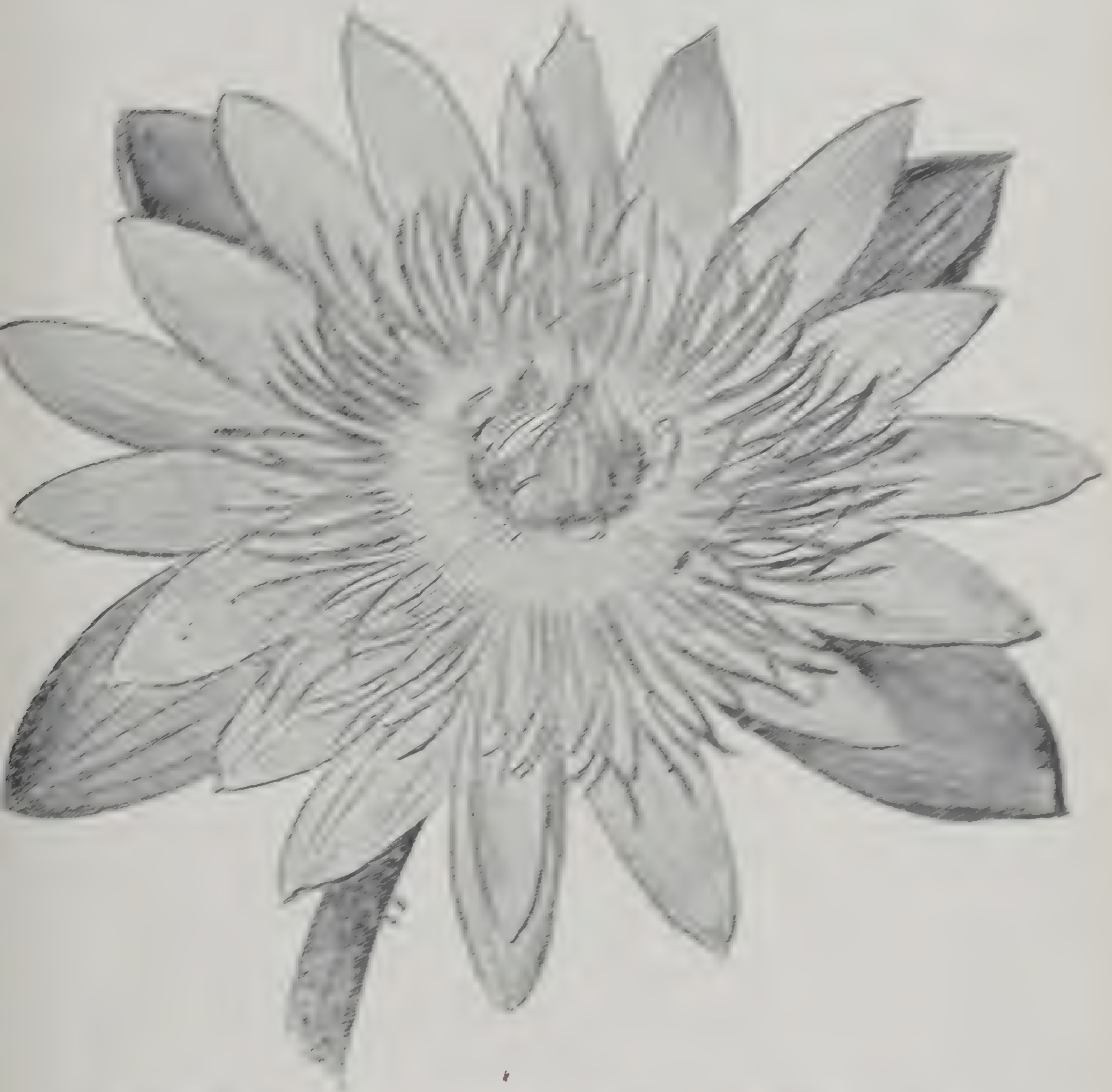


Fig. 99.—Nymphaea stellata 'Earl of Warwick.' (*The Garden.*)

To *Nymphaea* 'Earl of Warwick' (votes, unanimous), from the Earl of Warwick, Dunmow, Essex. A large variety after the style of *N. stellata*. Sepals mauve; petals bright bluish-lilac. The anthers form a very conspicuous yellow centre. (Fig. 99.)

To *Spiraea venusta magnifica* (votes, unanimous), from Mr. A. Perry, Enfield. Growing to a height of 7 feet, and producing at the top dense panicles of rosy pink flowers.

To *Tunica Saxifraga alba plena* (votes, 12 for), from Messrs. Bakers, Codsall. A double, white-flowered form of the well known *T. Saxifraga.* Very free-flowering.

Other Exhibits.

Messrs. Blackmore and Langdon, Bath: Carnations.
Messrs. Cannell, Swanley: Rose, 'American Pillar.'
Messrs. Clark, Dover: Carnations.
Mrs. Hadley, Reigate: Carnations.
Messrs. Low, Enfield: *Haemanthus cinnabarinus.*
Mrs. Peacock, Reigate: Delphiniums.

FLORAL COMMITTEE, AUGUST 12, 1909.

SUB-COMMITTEE AT WISLEY.

Mr. J. DOUGLAS, V.M.H., in the Chair, and two members present.

The following were Highly Commended (**XXX**):—

Pentstemon 'Clad in Beauty,' from Hon. V. Gibbs, Elstree.

Pentstemon 'Schwester Sophie,' from Mr. W. Pfitzer, Stuttgart.

Phlox 'Mounet Sulley,' from Mr. J. Forbes, Hawick.

Phlox 'Espérance,' from Mr. J. Forbes, and Messrs. Dobbie, Rothesay.

Phlox 'G. A. Strohlein,' from the Chiswick collection.

Phlox 'Sesostris,' from Mr. J. Forbes, and Messrs. Dobbie, Rothesay.

Delphinium, dwarf bedding, dark blue, from Messrs. Carter, High Holborn.

Delphinium, dwarf bedding, deep pink, from Messrs. Carter.

Gypsophila elegans carminea, from Messrs. Barr, Surbiton, Messrs. Nutting, Southwark Street, S.E., and Mr. F. Roemer, Quedlinburg.

FLORAL COMMITTEE, AUGUST 17, 1909.

Mr. H. B. May in the Chair, and fifteen members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. May, Upper Edmonton, for Crotons.
To Messrs. J. Veitch, Chelsea, for trees and shrubs.

Silver Flora Medal.

To Messrs. Bunyard, Maidstone, for hardy plants.
To Messrs. Kelway, Langport, for Gladioli.
To Messrs. G. Paul, Cheshunt, for Phloxes.
To Mr. M. Prichard, Christchurch, for hardy plants.

Silver Banksian Medal.

To Mr. A. Perry, Enfield, for hardy plants.

Award of Merit.

To *Astilbe rivularis gigantea* (votes, 9 for, 1 against), from Mr. A. Perry, Enfield. Leaves 18 inches in length, biternate, doubly serrate, upper surface dark green ; lower surface pale green. The drooping cream-coloured flowers are borne on a panicle 2 feet 6 inches long. The plant grows to a height of 6 feet.

To *Canna* 'Roi Humbert' (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., and Messrs. J. Veitch, Chelsea. A dark-leaved, orchid-flowered variety, with a bold spike of large orange-crimson flowers.

To *Gladiolus* 'Lord Alverstone' (votes, 13 for), from Messrs. Kelway, Langport. Long bold spike ; flowers medium sized, outer perianth-pieces scarlet ; inner, scarlet-magenta.

To *Gladiolus* 'Miss Ada Reeve' (votes, 10 for, 3 against), from Messrs. Kelway. Long bold spike, sturdy habit ; flowers very large, pure white, streaked in throat with rosy purple.

To *Polystichum aculeatum pulcherrimum plumosum* (votes, unanimous), from C. B. Green, Esq., Acton. A very plumose variety.

Botanical Certificate.

To *Anemonopsis macrophylla* (votes, unanimous), from Mr. A. Perry, Enfield. Leaves biternate, coarsely toothed. Flowers white and purple, after the style of *Anemone japonica*, but smaller. Introduced from Japan in 1869.

Other Exhibits.

Mr. F. Brazier, Caterham : Carnations.
Messrs. Dobbie, Rothesay : Antirrhinums.
Mr. T. Down, Alton : Phlox.
Mr. C. Elliott, Stevenage : alpines.
Messrs. R. Harkness, Hitchin : Hollyhocks.
Messrs. Heath, Cheltenham : Campanulas, &c.
Messrs. Low, Enfield : Rose 'Orleans.'
Messrs. Peed, Streatham : Gloxinias.
Mr. R. Pocock, Stratford-on-Avon : Carnations.
Mr. E. Potten, Cranbrook, Kent : flowering plants.
Mr. G. Reuthe, Keston : hardy plants.
Mr. L. R. Russell, Richmond : Fuchsias.

Floral Committee, August 31, 1909.

Mr. W. Marshall, V.M.H., in the Chair, and fifteen members present.

Awards Recommended :—

Gold Medal.

To the Harvard University, Mass., for a collection of photographs, representing the flora and fauna of Central and Western China, taken by Mr. E. H. Wilson, during his third journey to that region.

Silver-gilt Flora Medal.

To Messrs. Carter Page, London Wall, E.C., for Dahlias.
To Messrs. J. Veitch, Chelsea, for new Chinese plants.
To Messrs. Wallace, Colchester, for Gladioli and Montbretias.

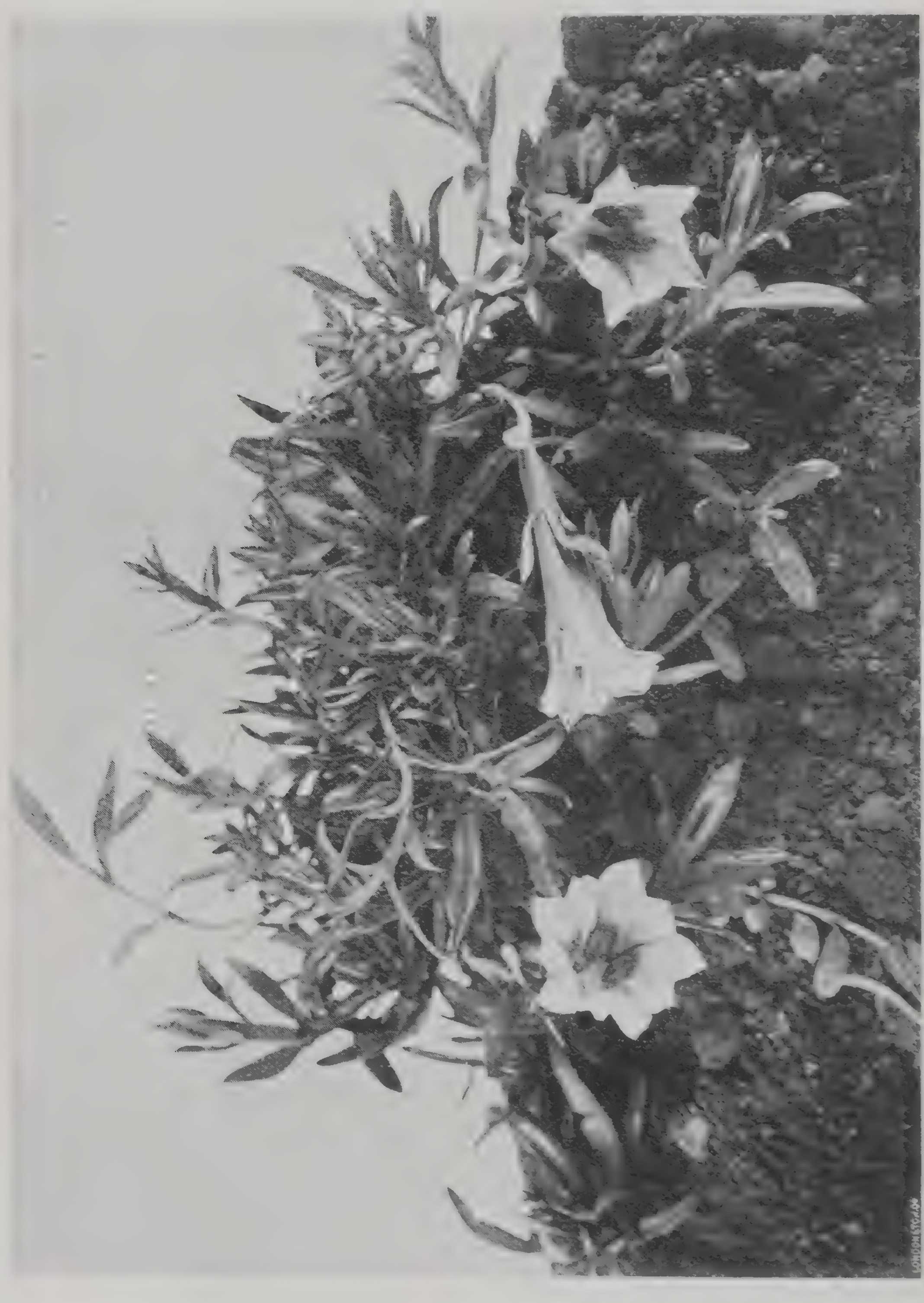


Fig. 100.—Gentiana Veitchiorum. (p. clix.)

Silver-gilt Banksian Medal.

To Messrs. R. Harkness, Hitchin, for Gladioli and Roses.
To S. Morris, Esq., Thetford, for Montbretias.

Silver Flora Medal.

To Messrs. Eames, Frome, for Phloxes, &c.
To Messrs. Kelway, Langport, for Gladioli.
To Mr. L. R. Russell, Richmond, for Clematis.

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for Gladioli, &c.
To Messrs. Dobbie, Rothesay, for Sweet Peas.
To Messrs. Gunn, Birmingham, for Phloxes.
To Messrs. May, Upper Edmonton, for Carnations.
To Mr. A. Perry, Enfield, for herbaceous plants.
To Mr. G. Reuthe, Keston, for herbaceous plants.

Award of Merit.

To *Gentiana Veitchiorum* (votes, unanimous), from Messrs. J. Veitch, Chelsea. Certificated under the name of *G. ornata*. A dwarf species after the style of *G. acaulis*. Leaves linear-lanceolate, corolla funnel-shaped, about 2 inches long, deep blue, with a broad green line at the back of each petal. It was collected in China by Mr. Wilson, and is perfectly hardy. (Fig. 100.)

To *Montbretia* 'George Henley' (votes, unanimous), from S. Morris, Esq., Wretham Hall, Thetford. Flowers 3 inches across, bright chrome yellow tinged with red in eye, of good form and substance. Stems 2 feet 6 inches high, scarcely branched, holding flowers erect. The buds just before opening deep orange.

To *Montbretia* 'Pageant' (votes, unanimous), from Col. Petre, Norwich. Stems 3 feet 6 inches high, much branched; flowers 2 inches in diameter, orange-chrome, with red eye, and faint ring of red a short distance from eye. A very free and showy variety.

Other Exhibits.

Mr. F. Brazier, Caterham: hardy plants.
Messrs. Cheal, Crawley: Dahlias, &c.
Mr. A. Ll. Gwillim, New Eltham: Begonias.
Messrs. Hartman, Copenhagen: Carnations.
Mr. J. Hudson, V.M.H., Gunnersbury Park, Acton: *Helenium* 'Lilian.'
Messrs. J. Peed, Streatham: herbaceous plants.
Mr. W. Pfitzer, Stuttgart: Gladioli.
Messrs. Rogers, Basset: Pelargoniums.
Mr. H. Shoesmith, Woking: Dahlias.
Messrs. Stredwick, St. Leonards: Dahlias.
Mr. C. Turner, Slough: Dahlia and Phlox.
Messrs. T. S. Ware, Feltham: hardy plants.
Messrs. Wells, Merstham, Surrey: Pentstemons, Phloxes, and Chrysanthemums.
Mr. C. Willis, Palmer's Green, N.: Dahlia.

ORCHID COMMITTEE.

MAY 4, 1909.

Mr. J. GURNEY FOWLER in the Chair, and nineteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Cypher, Cheltenham, for a group.
To Messrs. Hugh Low, Enfield, for a group.

Silver Banksian Medal.

To Messrs. McBean, Cooksbridge, for Odontoglossums, &c.
To Monsieur Mertens, Ghent, for hybrid Odontoglossums.

First-class Certificate.

Laeliocattleya × 'Dr. R. Schiffman,' Westonbirt variety (*C. Mendelii* × *L.-c.* × *callistoglossa*) (votes, unanimous), from Lieut.-Colonel G. L. Holford, C.I.E., C.V.O. (gr., Mr. H. G. Alexander). A very large and finely formed flower. Sepals and petals silver-white, tinged and slightly veined with rose. Lips purplish-crimson with chrome-yellow disc. (Fig. 101.)

Botanical Certificate.

To *Brassavola Martiania*, from Sir Trevor Lawrence, Bart., K.C.V.O. (gr., Mr. W. H. White). A small growing species of the *B. Perrinii* class. Flowers white with fringed ovate labellums.

To *Epidendrum densiflorum*, from Sir Trevor Lawrence, Bart. A tall growing species resembling *E. paniculatum*, the greenish flowers being closely arranged on the inflorescence.

Cultural Commendation.

To Mr. H. J. Chapman, gr. to Norman C. Cookson, Esq., for a very fine *Odontoglossum Andersonianum Crawshayanum.*

Other Exhibits.

Lieut.-Colonel G. L. Holford, C.I.E., C.V.O. : new hybrids.

J. Gurney Fowler, Esq. : *Brassocattleya* × 'The Baron.' (**F.C.C.** April 3, 1906.)

The Duke of Marlborough : *Odontoglossum crispum* 'Dinah.'

de B. Crawshay, Esq. : *Odontoglossum* × 'Theodora' and *Odontioda* × *Charlesworthii* 'Theodora.'

Sir Trevor Lawrence, Bart., K.C.V.O. : rare species.

Messrs. Charlesworth : rare species.

J. Rutherford, Esq. : *Odontoglossum* × *amabile*, Beardwood variety, and other orchids.

Francis Wellesley, Esq. : two fine plants of *Cattleya Mendelii.*

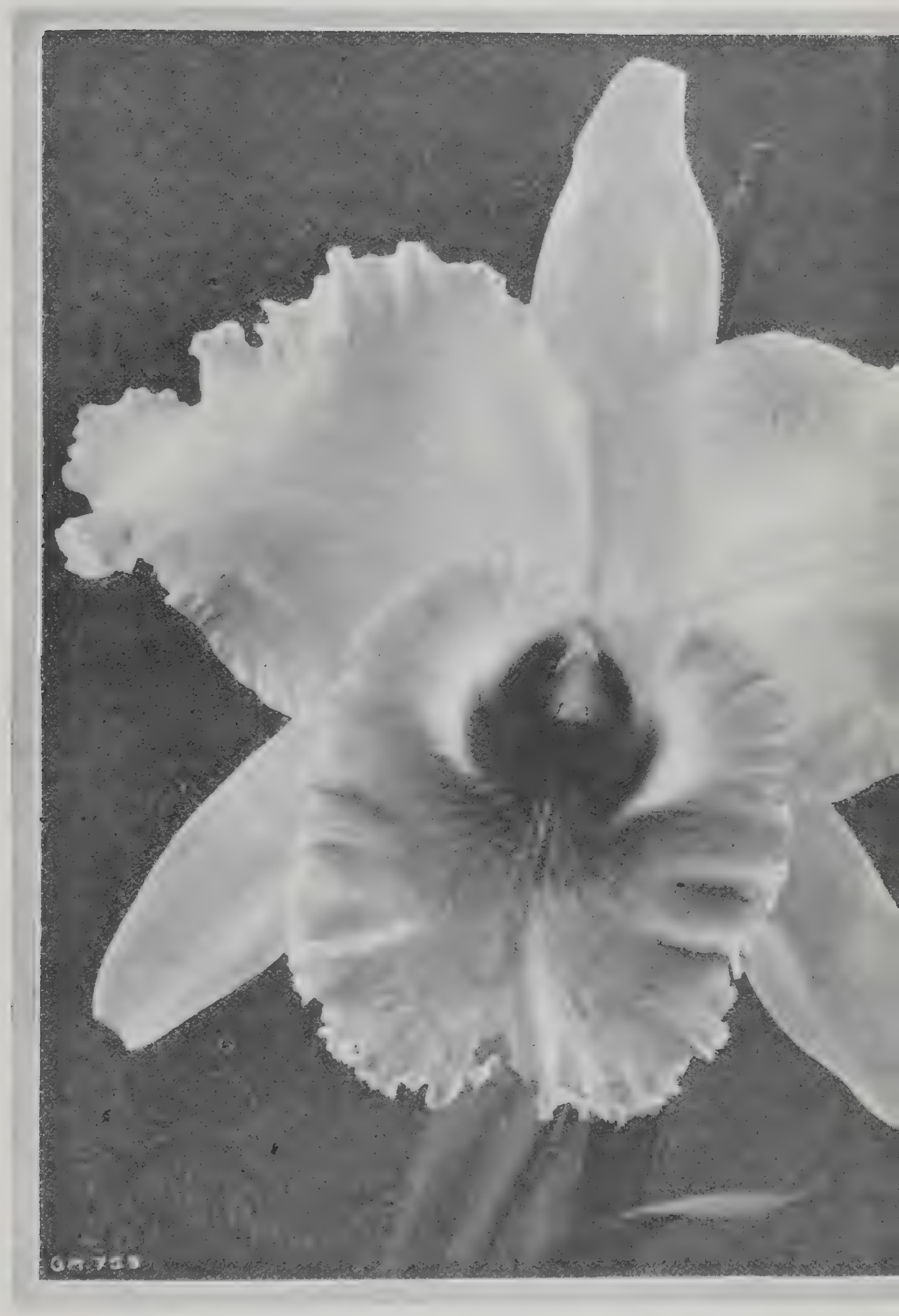


FIG. 101.—LAELIOCATTLEYA × 'DR. R. SCHIFFMAN,' WESTONBIRT VAR. (*Gar*
(p. clx.)

Mr. A. W. Jensen : *Cattleya Mendelii* with ninety-six flowers.
Mr. C. Ravens, Odense, Denmark : white *Cattleya Luddemanniana.*
Miss Edith M. Argles : *Dendrobium densiflorum* with ten spikes.

ORCHID COMMITTEE, MAY 18, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-two members present.

Awards Recommended :—

Silver Flora Medal.

To Henry Little, Esq., Baronshalt, Twickenham (gr., Mr. Howard), for a group of varieties of *Laelia purpurata.*

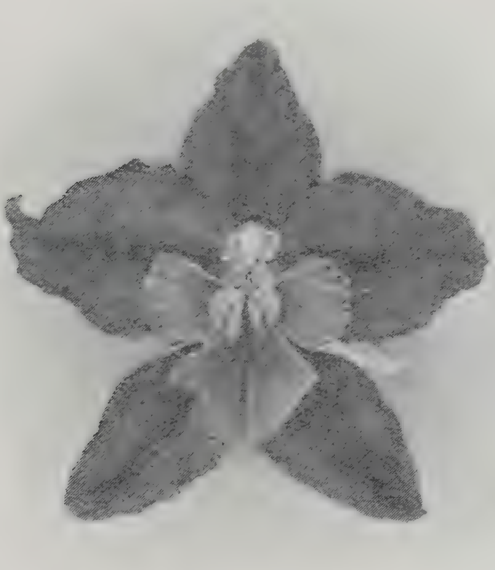


FIG. 102.—ODONTIODA × VUYLSTEKEAE VAR. CRAWSHAYANA.

First-class Certificate.

To *Odontioda* × *Vuylstekeae* var. *Crawshayana* (*O. Pescatorei* × *C. Noezliana*) (votes, unanimous), from de B. Crawshay, Esq. Differing from the orginal blotched form in having the flowers uniformly of a bright scarlet-red, with yellow crest to the lip. (Fig. 102.)

Other Exhibits.

Lieut.-Colonel G. L. Holford, C.I.E., C.V.O. : hybrid Orchids and *Odontoglossum Pescatorei* with 125 flowers on a spike.

Baron Sir H. Schröder : *Cattleya iricolor.*
de B. Crawshay, Esq. : hybrid Odontoglossums.
H. S. Goodson, Esq. : rare Orchids.
Mr. A. W. Jensen : Cattleyas and Odontoglossums.
J. Forster Alcock, Esq. : hybrid *Cymbidium.*
Monsieur Mertens : hybrid Odontoglossums.

ORCHID COMMITTEE, MAY 25, 26, 27, 1909.

AT THE INNER TEMPLE GARDENS.

Mr. HARRY J. VEITCH in the Chair, and twenty-four members present.

[For Cups and Medals awarded by the Council after consultation with the Judges see p. xciv.]

Awards Recommended :—

First-class Certificate.

To *Oncidium Charlesworthii* (votes, 13 for, 1 against), from Messrs. Charlesworth, Haywards Heath. Resembling a very large form of *O. crispum*. Flowers dark chocolate brown, with slight wavy lines of a yellow hue. Crest of the lip as in *O. Marshallianum*, and with a bright yellow middle portion, the blade blotched with brown. (Fig. 103.)

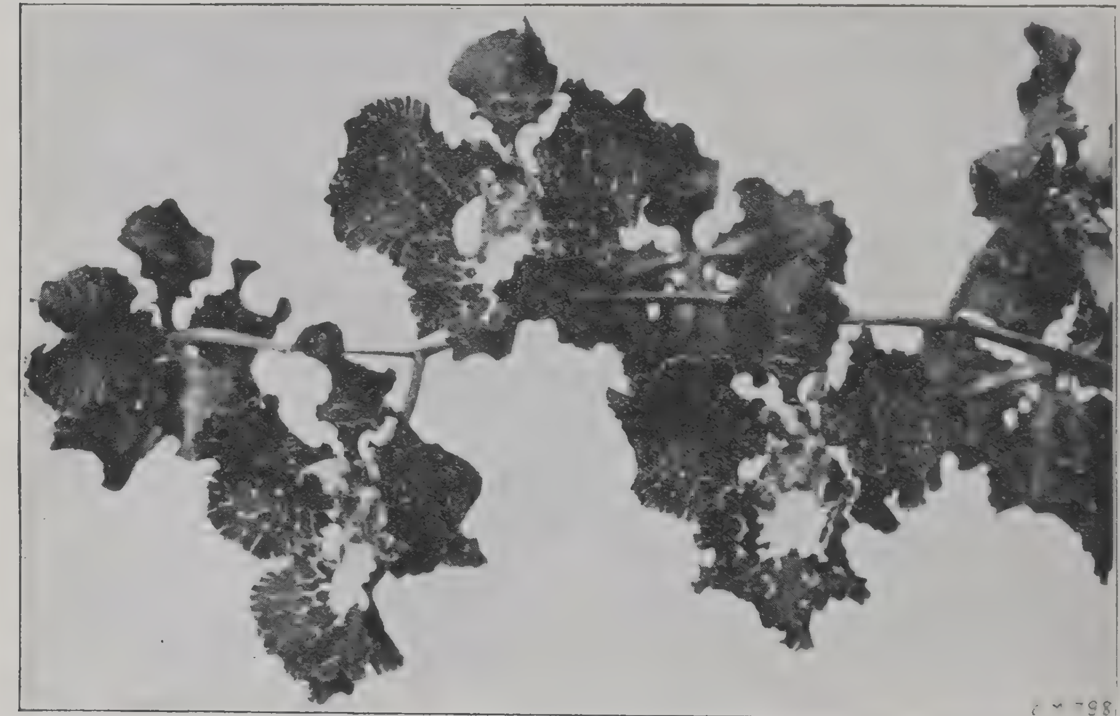


FIG. 103.—ONCIDIUM CHARLESWORTHII. (*Gardeners' Magazine.*)

To *Laeliocattleya* × 'Eurylochus' (*C. granulosa Schofieldiana* × *L.-c.* × 'Lady Miller') (votes, unanimous), from Messrs. Charlesworth. Flowers borne four on an upright spike and partaking strongly of *C. granulosa*, except in the tubular base to the labellum, which is yellow with a ruby crimson front lobe. Sepals and petals orange with a bronze shade.

To *Odontoglossum* × *mirum* 'Emperor of India' (*Wilckeanum* × *crispum*) (votes, unanimous), from Monsieur Chas. Vuylsteke, Ghent. Larger than *O. Wilckeanum*. Flowers white heavily blotched with purple. (Fig. 104.)

To *Odontoglossum* × 'Aglaon' (*Vuylstekeae* × *eximium*) (votes, unanimous), from Monsieur Chas. Vuylsteke. Form and colour of

O. Vuylstekeae, but of a darker tint; ground colour white, almost covered with deep reddish claret blotches. (Fig. 105.)

To *Odontoglossum* × 'Princess Victoria Alexandra' (parentage unknown) (votes, unanimous), from Monsieur Chas. Vuylsteke. Flowers deep purplish red with a narrow white margin to the segments. (Fig. 106.)

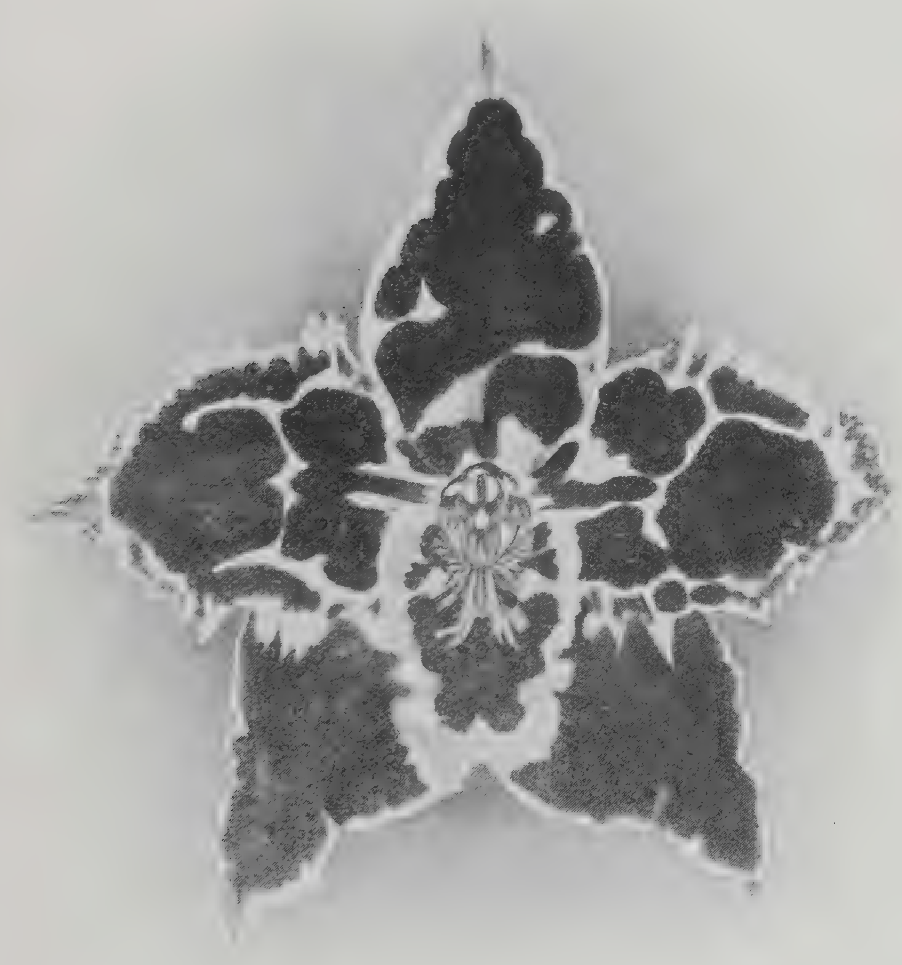


Fig. 104.—Odontoglossum × mirum 'Emperor of India.' (p. clxii.)

Award of Merit.

To *Cattleya Mossiae*, Gatton Park variety (votes, 11 for, 2 against), from Sir Jeremiah Colman, Bart., V.M.H. (gr., Mr. Collier). A fine flower of typical *C. Mossiae* colour, but with very broad, slightly decurved petals.

Botanical Certificate.

To *Bulbophyllum lemniscatoides*, from Sir Jeremiah Colman, Bart., V.M.H. A singular species with a nodding raceme of blackish flowers with whitish hair-like fringe. Native of Java.

To *Gongora quinquenervis*, from Sir Jeremiah Colman, Bart., V.M.H. Flowers on a drooping raceme, insect-like in form, brownish red.

To *Sigmatostalix Eliae*, from Mr. J. Birchenall, Alderley Edge. An elegant little species with yellow flowers spotted with red.

To *Oncidium Retemeyerianum*, from Mr. J. Birchenall. Leaves fleshy; inflorescence straggling; flowers spotted brown; lip claret.

Cultural Commendation.

To Mr. Fletcher (gr. to R. Ashworth, Esq.), for a fine specimen of the blue *Dendrobium Victoria Regina.*

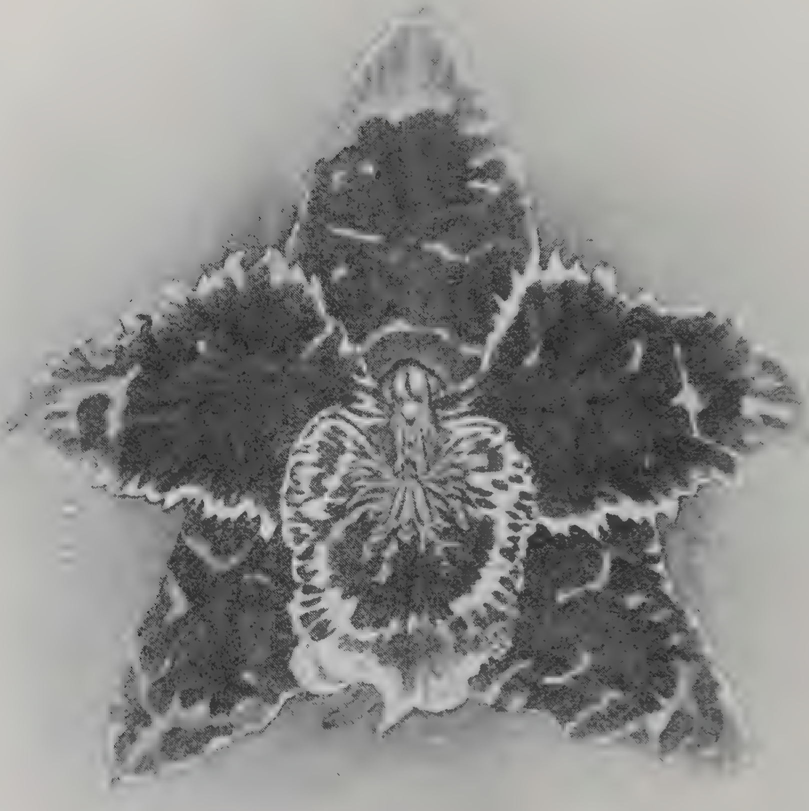


FIG. 105.—ODONTOGLOSSUM × 'AGLAON.' (p. clxii.)

Other Exhibits.

F. Menteith Ogilvie, Esq.: a group.
Messrs. Charlesworth: a group.
Messrs. Sander: a group.
The Duke of Marlborough: a group.
Messrs. Moore: a group.
Messrs. Cypher: a group.
Messrs. Hugh Low: a group.
Messrs. Armstrong & Brown: a group.
Monsieur Chas. Vuylsteke: Odontoglossums.

The Executors of the late Norman C. Cookson : Odontoglossums.
Mr. J. Robson : Odontoglossums.
Leopold de Rothschild, Esq. : group of *Vanda teres*.
Messrs. Bull : a group.

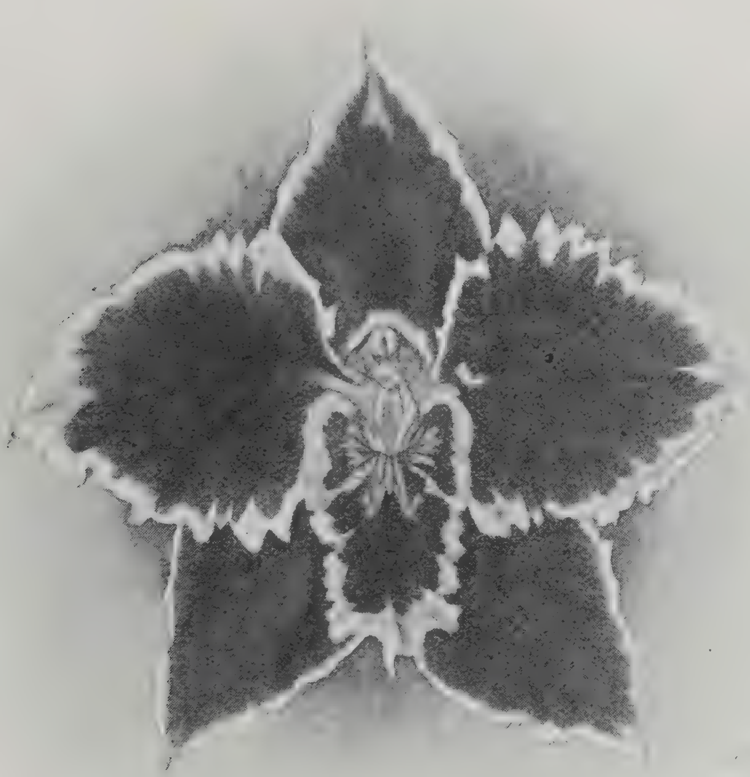


FIG. 106.—ODONTOGLOSSUM × 'PRINCESS VICTORIA ALEXANDRA.' (p. clxiii.)

Mrs. Wood, Glossop : a group.
Messrs. Stanley : Cattleyas.
Richard Ashworth, Esq. : a group.
Messrs. Jas. Veitch : a group.

ORCHID COMMITTEE, JUNE 8, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Stuart Low, Bush Hill Park, for a group.
To Messrs. Sander, St. Albans, for a group.
To Messrs. Charlesworth, Haywards Heath, for hybrid Orchids.
To H. S. Goodson, Esq., Putney, for a group.

Silver Banksian Medal.

To Messrs. J. Veitch, Chelsea, for Odontoglossums and Cattleyas.
To Mr. A. W. Jensen, Lindfield, for varieties of *Cattleya Mendelii.*
To Messrs. McBean, Cooksbridge, for Odontoglossums.
To Messrs. Moore, Rawdon, for a group.

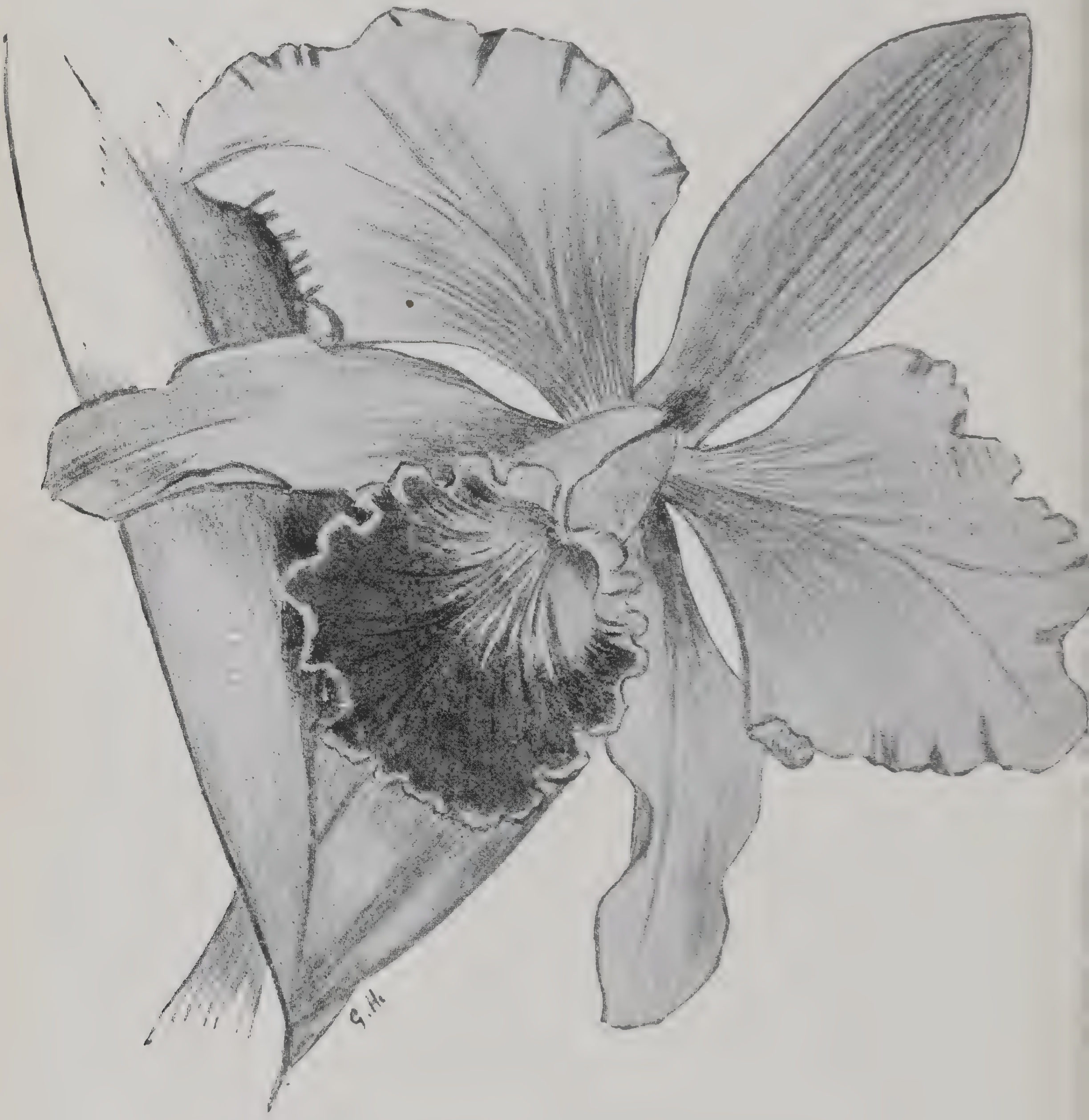


Fig. 107.—Laeliocattleya 'Mikado.' (*The Garden.*)

First-class Certificate.

To *Laeliocattleya* × 'Mikado' (parentage unrecorded) (votes, unanimous), from Lieut.-Colonel G. L. Holford, C.I.E., C.V.O., Westonbirt, (gr., Mr. H. G. Alexander). Flowers of good size and shape; sepals and petals canary yellow; lip ruby crimson with a light yellow tube. (Fig. 107.)

Award of Merit.

To *Cattleya Mossiae* var. 'A. Dimmock' (votes, unanimous), from Lieut.-Colonel G. L. Holford. A large flower of the *C. M. Reineckiana* class; blush white with violet blotch on the lip, which has a broad white margin.

To *Laeliocattleya* × 'Feronia' (*C.* 'Enid' × *L.-c.* × *Haroldiana*) (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O. (gr., Mr. W. H. White). Sepals and petals cream-white tinged with yellow, the petals being also flushed with rose; lip deep ruby-red.

To *Odontoglossum* × *amabile Fowlerianum* (*crispum* × *crispo-Harryanum*) (votes, unanimous), from J. Gurney Fowler, Esq., Glebelands (gr., Mr. J. Davis). A large flower with broad segments, rosy on the outer halves, the inner portions heavily blotched with red-brown; front of the lip white.

Botanical Certificate.

To *Angraecum expansum*, from Sir Trevor Lawrence, Bart., K.C.V.O. Growth upright; leaves leathery; inflorescence bearing two fleshy white flowers with nearly equal segments and long greenish spur.

To *Cirrhopetalum vaginatum*, from Sir Trevor Lawrence, Bart. Flowers in close umbels, cream-white.

Cultural Commendation.

To Mr. W. H. White, orchid grower to Sir Trevor Lawrence, Bart. for a fine specimen of *Dendrobium Jerdonianum*.

Other Exhibits.

Mr. F. McBean, Plumpton: a group.
Monsieur Mertens: Odontoglossums.
H. A. Tracy, Esq.: various Orchids.
Walter Cobb, Esq.: hybrid Odontoglossum.
The Hon. Mrs. Foley: *Lissochilus*.
Eustace F. Clark, Esq.: Laeliocattleyas.

ORCHID COMMITTEE, JUNE 22, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-four members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Stuart Low, Enfield, for a group.

Silver Banksian Medal.

To Mr. A. W. Jensen, Lindfield, for Cattleyas.
To Messrs. Stanley, Southgate, for Cattleyas.

Other Exhibits.

Monsieur Mertens, Ghent: Odontoglossums.
J. G. Bergheim, Esq. (gr., Mr. Page): *Megaclinium triste*.

R. G. Thwaites, Esq.: Odontoglossum.
Baron Sir H. Schröder: *Odontoglossum* 'Black Prince.'

ORCHID COMMITTEE.

AT HOLLAND HOUSE, JULY 6, 1909.

MR. H. J. VEITCH in the Chair, and twenty-one members present.

[For Cups and Medals awarded by the Council after consultation with the Judges see p. ci.]

Awards Recommended :—

First-class Certificate.

To *Laeliocattleya* × *Martineti* 'The Prince' (*L. tenebrosa* × *C. Mossiae aurantiaca*) (votes, unanimous), from Messrs. Sander, St. Albans. A very fine hybrid with rich bronzy-orange sepals and petals and deep vinous-purple lip. (Fig. 108.)

Award of Merit.

To *Cattleya Mossiae Wageneri Sanderae* (votes, 9 for, 4 against), from Messrs. Sander, St. Albans. A pure white flower of fine shape, the disc of the lip yellow.

Certificate of Appreciation.

To *Miltonioda* × *Harwoodii* (*Miltonia vexillaria* × *Cochlioda Noezliana*). A new bigeneric hybrid raised by the exhibitors, Messrs. Charlesworth, and still immature. The very small plant bore one flower about two inches in length. Sepals and broader petals bright cerise-rose; lip cream-white freckled with rose.

Cultural Commendation.

To Mr. G. E. Day (gr. to H. S. Goodson, Esq., Putney), for a specimen of the white *Cattleya Mossiae Wageneri* with seventeen flowers.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr., Mr. H. G. Alexander): the large-flowered, blotched *Odontoglossum crispum* 'Sappho.'

Mr. G. Bornemann, Blankenburg, Harz, Germany: an interesting collection of spikes of hybrid Disas.

ORCHID COMMITTEE, JULY 20, 1909.

MR. H. J. VEITCH in the Chair, and twenty-two members present.

Awards Recommended :—

Silver Flora Medal.

To F. M. Ogilvie, Esq., The Shrubbery, Oxford (gr., Mr. Balmforth), for Odontoglossums and *Miltonia vexillaria*.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Sander, St. Albans, for hybrids and rare species.

To Messrs. Stuart Low, Bush Hill Park, for Cattleyas and Odontoglossums.

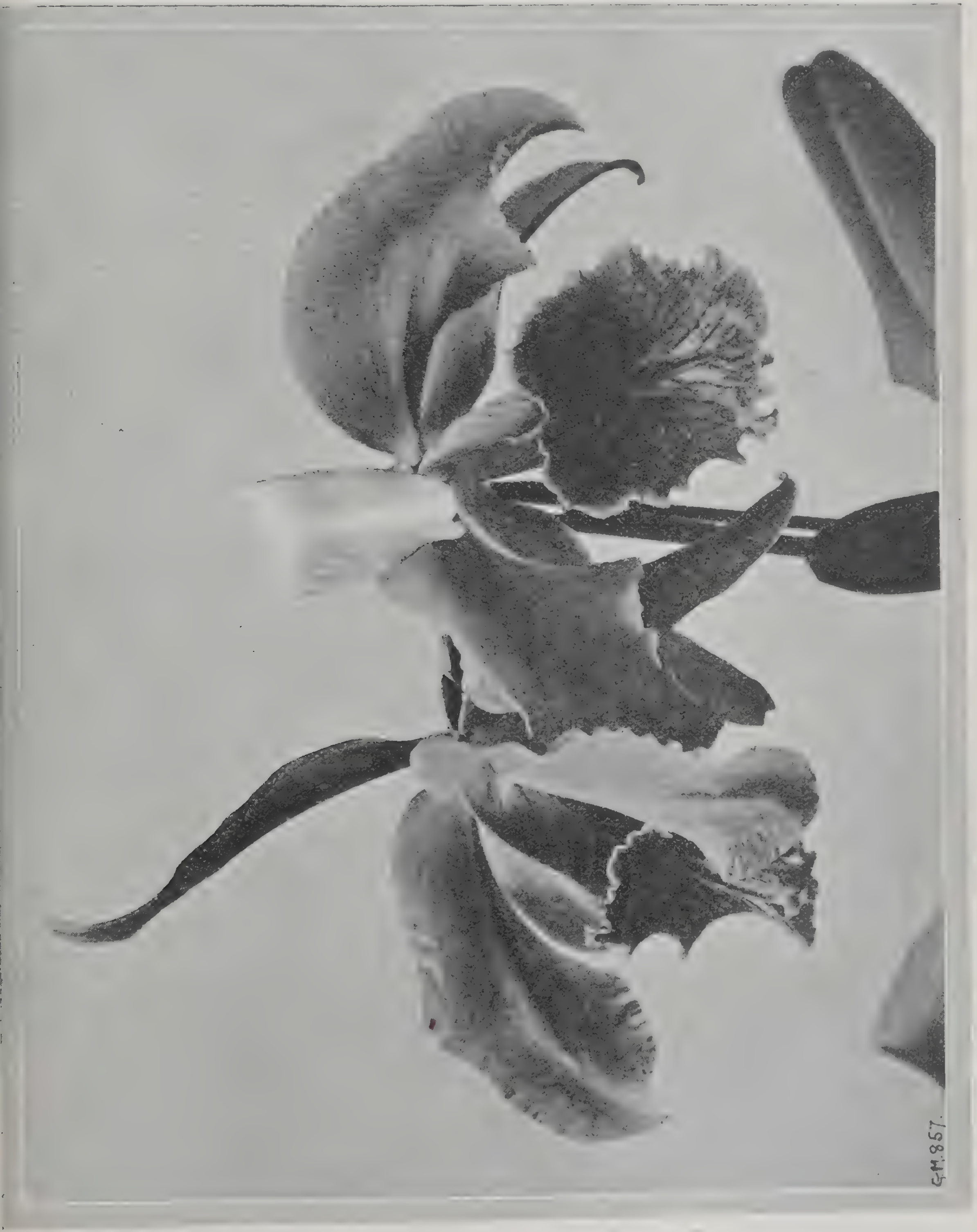


Fig. 108.—Laeliocattleya × Martineti 'The Prince.' (*Gardeners' Magazine.*) (p. clxviii.)

Award of Merit.

To *Spathoglottis plicata alba* (votes, unanimous), from Sir Jeremiah Colman, Bart., V.M.H., Gatton Park (gr., Mr. Collier). A true albino of the pretty purple species; flowers pure white with a pale yellow base to the lip.

To *Odontoglossum* × *ardentissimum* 'Starlight' (*Pescatorei* × *crispum* 'Starlight') (votes, unanimous), from Messrs. Sander, St. Albans. Flowers marked like *O. crispum* 'Starlight'; sepals and petals cream-white tinged with rose, and bearing a profusion of small red-purple spots; lip white with red-brown blotches at the base.

Botanical Certificate.

To *Nephelaphyllum pulchrum*, from Sir Jeremiah Colman, Bart. A dwarf plant with stalked leaves having cordate blades, yellowish, marked with olive brown; flowers whitish.

To *Megaclinium Arnoldianum*, from Messrs. Sander. Allied to *M. falcatum*, but with lighter green pseudo-bulbs; flowers rose and yellow.

To *Oncidium pumilum*, from Mr. Gurney Wilson, Glenthorne, Haywards Heath. A dwarf plant with a branched inflorescence of yellow flowers.

Cultural Commendation.

To Mr. W. H. White, orchid grower to Sir Trevor Lawrence, Bart., K.C.V.O., for finely flowered flowers of *Habenaria rhodocheila.*

To Mr. W. H. White for *Vanda* × 'Miss Joaquim' (*Hookeriana* × *teres*) with five spikes.

To Mr. W. Stevens (gr. to W. Thompson, Esq., Walton Grange), for *Odontioda* × *Charlesworthii superba.*

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: two handsome Laeliocattleyas.

Sir Trevor Lawrence, Bart., K.C.V.O.: several rare Orchids.

Mr. Gurney Wilson: the fine white *Brassocattleya* × *Digbyano-Mossiae*, Glenthorne variety.

C. J. Lucas, Esq.: *Brassocattleya* × 'Madame Chas. Maron.'

Mr. Geo. Bailey, Burgess Hill: Odontoglossums.

James H. Hill, Esq.: a group.

ORCHID COMMITTEE, AUGUST 3, 1909.

Mr. J. GURNEY FOWLER in the Chair, and ten members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Sander, St. Albans: group of rare species.

Silver Banksian Medal.

To Messrs. Stuart Low, Enfield: group.

First-class Certificate.

Dendrobium Sanderae (votes, unanimous), from Messrs. Sander, St. Albans. A fine new species allied to *D. Dearei*, but with larger, pure-white flowers; the base of the lip is emerald-green, the side lobes and middle striped with rose-purple.

Award of Merit.

To *Cattleya Warscewiczii* var. 'W. Waters Butler' (votes, unanimous), from W. Waters Butler, Esq., Southfield, Norfolk Road, Edgbaston, Birmingham. A large-flowered typical *C. Warscewiczii.* Sepals and petals bright rose; lip deep ruby-crimson with a small yellow blotch on each side of the tube. (Fig. 109.)

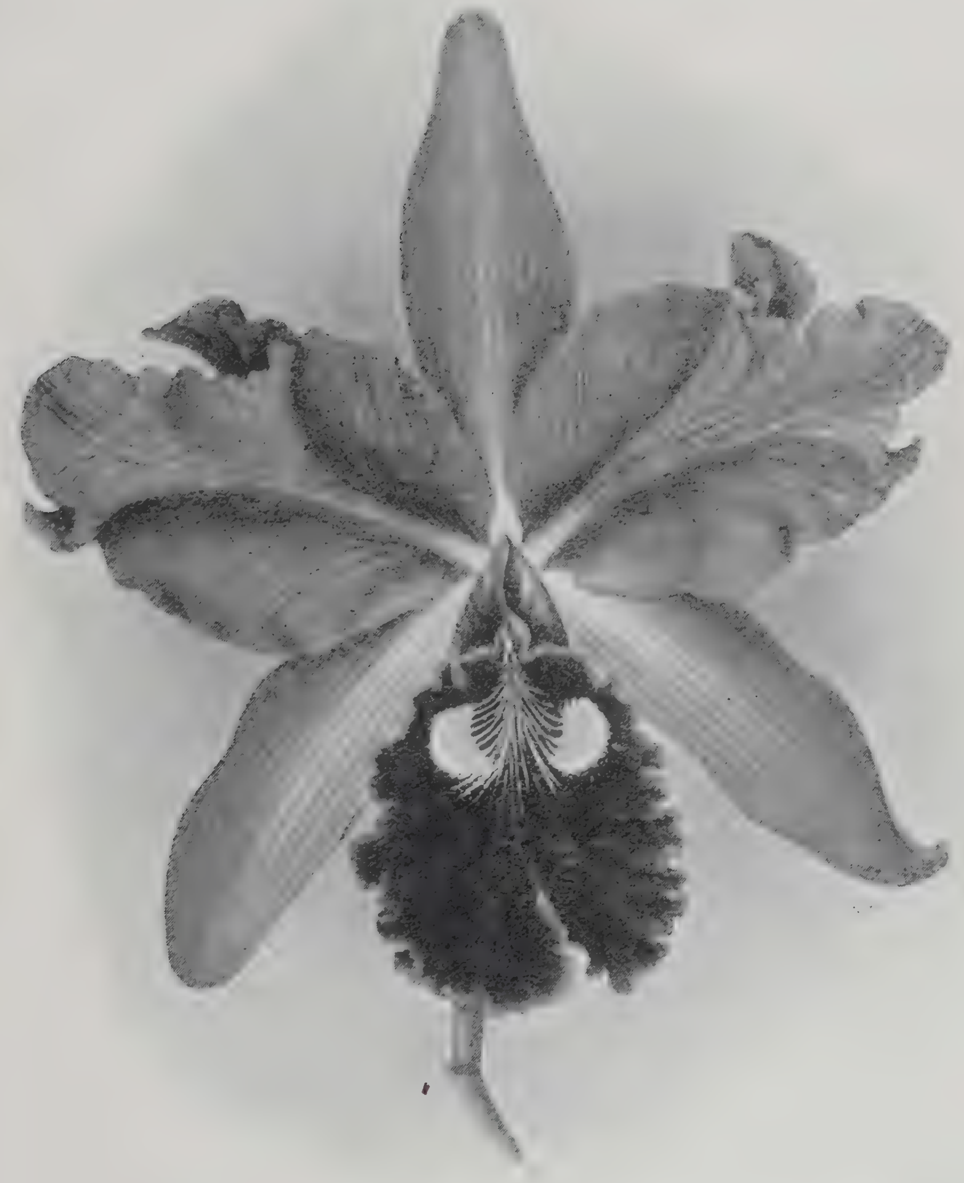


Fig. 109.—Cattleya Warscewiczii var. 'W. Waters Butler.'

Botanical Certificate.

To *Phaius pauciflorus*, from Sir Jeremiah Colman, Bart., V.M.H. (gr., Mr. Collier). Stems erect, slender, bearing on the upper part broadly ovate plicate leaves; flowers in pairs on the stems, white with red-brown markings on the lip. Collected in Java.

To *Eria ornata*, from Messrs. Stuart Low. Of the *Eria flava* section with evergreen fleshy green leaves and an erect inflorescence with a terminal head of brownish flowers, downy on the exterior and with a narrow, bright-red lip. Figured in the "Botanical Register," 1841, t. xlii., as *Eria armeniaca*.

Cultural Commendation.

To the Hon. Mrs. Foley, Packham, Fordingbridge, for *Angraecum caudatum*, with four spikes of flowers. Native of Western Africa.

Other Exhibits.

F. J. Hanbury, Esq., East Grinstead: hybrid Orchids.
J. Gurney Fowler, Esq: *Laeliocattleya* × 'Louisa Fowler' (*L.-c. callistoglossa* × *C. granulosa*).
Messrs. Charlesworth: rare Orchids.
R. G. Thwaites, Esq.: *Odontioda* × *Thwaitesii* and variety *superba*.
Messrs. McBean: Odontoglossums.
H. S. Goodson, Esq.: *Cattleya* × *Wavriniana*.
Monsieur Mertens: Odontoglossums.

ORCHID COMMITTEE, AUGUST 17, 1909.

Mr. J. GURNEY FOWLER in the Chair, and seventeen members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Mrs. Bischoffsheim, The Warren House, Stanmore (gr., Mr. Taylor), for a group of *Disa grandiflora*.

To Messrs. Sander, St. Albans, for a group.

Silver Flora Medal.

To Messrs. Charlesworth, Haywards Heath, for hybrids and rare species.

To Messrs. Stuart Low, Bush Hill Park, for a group.

Silver Banksian Medal.

To H. S. Goodson, Esq., Putney (gr., Mr. G. E. Day), for a group.

First-class Certificate.

To *Odontoglossum* × *Goodsonii* (*Uro-Skinnerii* × *Pescatorei*) (votes, twelve for, two against), from H. S. Goodson, Esq., Fairlawn, Putney (gr., Mr. Day). Flowers intermediate in size and form between the two parents; white, densely spotted with purple. (Fig. 110.)

To *Dendrobium acuminatum* (votes, unanimous), from Messrs. Moore, Rawdon, Leeds. A fine Philippine species allied to the Bornean *D. Treacherianum*. The plant bore an inflorescence of sixteen flowers, white tinged with pink, each two inches across (syn. *D. Lyonii* Ames). (Fig. 111.)

To *Cirrhopetalum pulchrum* var. *Cliftonii* (votes, 8 for, 4 against), from Messrs. Charlesworth. Flowers in many-flowered umbels, cream-white spotted with rose. (Fig. 112.)

Award of Merit.

To *Laeliocattleya* × 'Paetolus' (*L.-c. Massangeana* × *C. Dowiana aurea*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt (gr., Mr. Alexander). In form resembling *C. Dowiana aurea*; sepals and petals primrose-yellow; lip violet-purple with gold lines at the base.

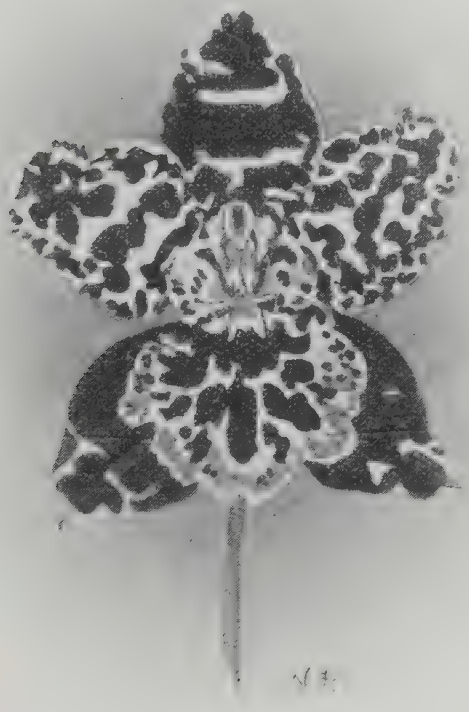


FIG. 110.—ODONTOGLOSSUM × GOODSONII. (p. clxxii.)

To *Vanda coerulea* 'Dreadnought' (votes, unanimous), from Messrs. Sander, St. Albans. Flowers large and of fine shape, veined and tinged with deep blue; lip violet.

To *Laeliocattleya* × 'Invincible' (*C. Dominiana* × *L.-c.* × *bletchleyensis*) (votes, unanimous), from Messrs. Sander. Sepals and petals bright purplish-rose; lip ruby-claret.

To *Laeliocattleya* × 'Black Prince' (*L.-c.* × *bletchleyensis* × *C.* × *Hardyana*) (votes, unanimous), from H. S. Goodson, Esq. (gr., Mr. Day). Resembling *L.-c.* × *bletchleyensis* in form; flowers bright rose with dark maroon lip.

Cultural Commendation.

To Mr. G. E. Day (gr. to H. S. Goodson, Esq.) for *Cattleya Gaskelliana alba* with eleven flowers.

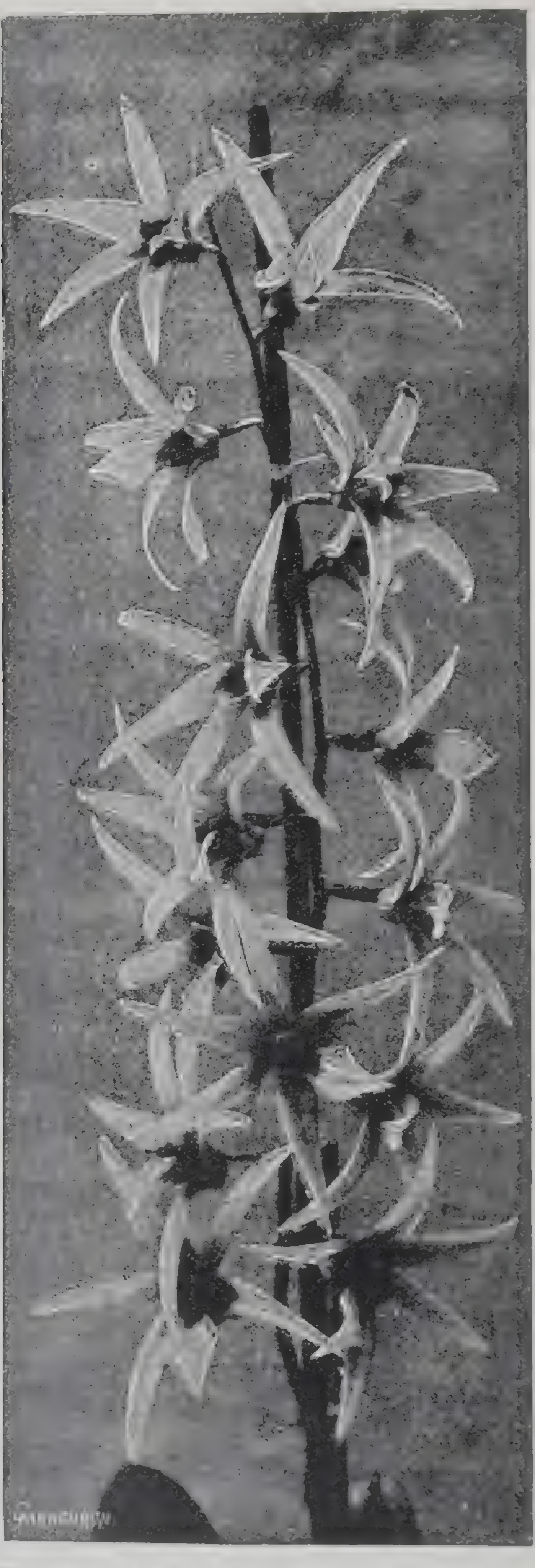


FIG. 111.—DENDROBIUM ACUMINATUM. (*Gardeners' Chronicle.*) (p. clxxii.)

Other Exhibits.

W. Bolton, Esq: *Cattleya Warscewiczii Boltonii.*
Messrs. McBean: *Odontoglossum Pescatorei* var.
Mr. E. V. Low: a small group.
Messrs. Moore: *Brassia bicolor.*
Mr. Gurney Wilson: *Rodriguezia secunda.*

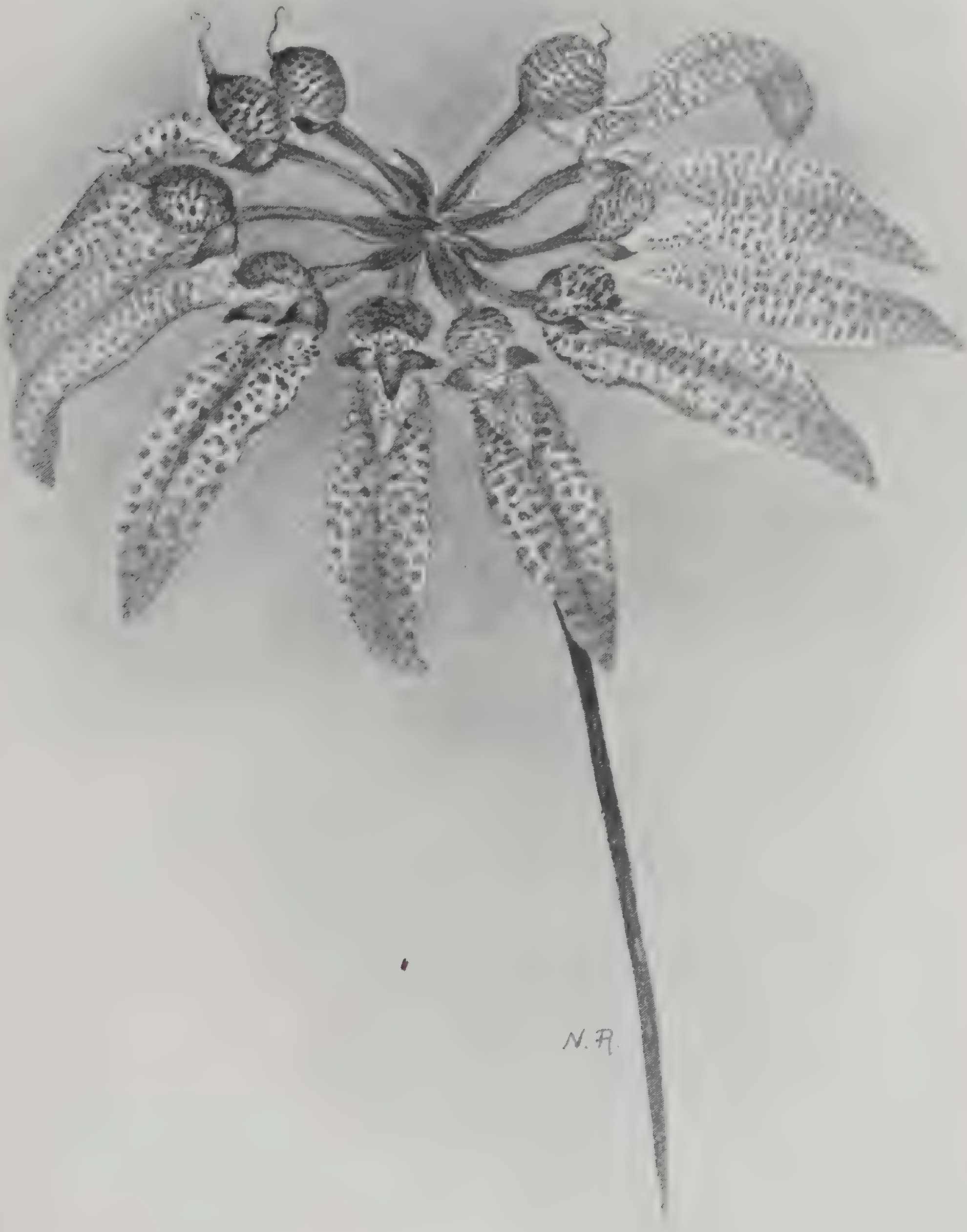


Fig. 112.—Cirrhopetalum pulchrum var. Cliftonii. (p. clxxiii.)

ORCHID COMMITTEE, AUGUST 31, 1909.

Mr. J. GURNEY FOWLER in the Chair, and twenty-one members present.

Awards Recommended.

Silver Flora Medal.

To Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt (gr., Mr. H. G. Alexander), for hybrid Cattleyas and Laeliocattleyas.

To H. S. Goodson, Esq., Putney (gr., Mr. Day), for a group.

To Messrs. Charlesworth, Haywards Heath, for hybrids and rare species.

To Messrs. Sander, St. Albans, for a group.

Silver Banksian Medal.

To Messrs. Stuart Low, Bush Hill Park, for a group.

Award of Merit.

To *Laeliocattleya* × 'Golden Oriole,' Westonbirt variety (*L.-c. Charlesworthii* × *C. Dowiana aurea*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. Sepals and petals bright chrome yellow; lip ruby-red veined with gold from the base to the centre.

To *Sophrocattleya* × *Blackii* (*S. grandiflora* × *C. Hardyana*) (votes, unanimous), from R. G. Thwaites, Esq., Streatham (gr., Mr. Black). Resembling a dark form of *Sophrocattleya* × 'Doris.' Flowers dark scarlet tinted with cherry-red.

Botanical Certificate.

To *Dendrobium muricatum*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. A remarkable species from New Caledonia, in growth resembling an *Eria*, and having short conical pseudo-bulbs, each furnished with a fleshy green leaf. The inflorescence springs from near the apex of the pseudo-bulb, and bears on the outer half a raceme of fifteen flowers, each an inch across, whitish mottled with chocolate purple, the crimped front of the narrow lip being yellow.

To *Angraecum* (= *Listrostachys*) *forcipatum*, from Sir Trevor Lawrence, Bart., K.C.V.O , V.M.H. (gr., Mr. White). A singular dwarf species from the Cameroons. Leaves semi-terete, fleshy. Inflorescence erect, bearing eight to ten pellucid white flowers the spurs of which are enlarged at the tips.

Certificate of Appreciation.

To *Odontioda* × *Grairiana* (*Odontoglossum Rossii majus* × *Cochlioda Noezliana*), from Monsieur H. Graire, Amiens. Growth of *Odontoglossum Rossii majus*. Inflorescence with several flowers bearing a resemblance to *O.* × *Bradshawiae* (fig. 34). Sepals and petals tinged with salmon-red; lip blush-white with yellow crest.

Cultural Commendation.

To Mr. H. G. Alexander, Orchid grower to Lieut.-Col. G. L. Holford for finely-grown hybrid Orchids.

Other Exhibits.

Sir Trevor Lawrence, Bart.: *Zygopetalum Lindenii.*
Sir Jeremiah Colman, Bart.: rare Orchids.
R. G. Thwaites Esq: hybrid Orchids.
F. Lowenadler, Esq.: *Dendrobium acuminatum.*
Messrs. William Bull: hybrid Cattleyas.
Baron Sir H. Schröder: hybrid Cypripediums.
Mr. H. A. Tracy: *Anguloa uniflora.*
Mr. E. V. Low: *Cattleya Gaskelliana alba.*
Arthur Burr, Esq.: *Laeliocattleya* × *eximia.*

NARCISSUS AND TULIP COMMITTEE.

March 9, 1909.

Mr. H. B. May in the Chair, and twenty-five members present.

Five daffodils were placed before the Committee, and a "Commendation as a Forced Variety" was granted to:—

Narcissus 'Circlet,' from Messrs. Cartwright & Goodwin, Kidderminster; and to:—

Narcissus 'Queen of the West,' from Messrs W. T. Ware, Bath. (Fig. 113.)

The Committee agreed that a "Commendation as a Forced Variety" should not be granted later than the first meeting in March.

The Rev. G. H. Engleheart proposed, and Mr. J. D. Pearson seconded, "That a new Classification Sub-Committee be appointed." This was carried unanimously and the following were elected:—Rev. W. Wilks, Rev. J. Jacob, Rev. G. H. Engleheart, and Messrs. J. T. Bennett-Pöe, E. A. Bowles, P. R. Barr, A. M. Wilson, W. T. Ware, E. M. Crosfield, and C. H. Curtis.

The following proposition was also unanimously accepted:—"That this Sub-Committee be instructed to consider the new Classification with regard to any alterations required in it, and to report to the Committee."

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Cartwright & Goodwin, Kidderminster, for forced daffodils.

Silver-gilt Banksian Medal.

To Lady Tate (gr., Mr. W. Howe), Park Hill, Streatham, for forced daffodils and tulips.

To Messrs. W. Cutbush, Highgate, for forced daffodils.

Silver Flora Medal.

To Messrs. R. H. Bath, Wisbech, for daffodils.

Narcissus and Tulip Committee, March 23, 1909.

Mr. H. B. May in the Chair, and nineteen members present.

There were no new daffodils before the Committee.

On the motion of the Rev. J. Jacob, seconded by Mr. H. F. Chapman, it was agreed, "That before any flower receives a 'Commendation as a Forced Variety,' a pot of the same, containing at least three plants, be placed before the Committee."

Considerable discussion arose over the question of the registration of varieties, but no definite conclusion was arrived at.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Cartwright & Goodwin, Kidderminster, for a group of daffodils, including 'White Lady,' 'Chaucer,' 'Sunset,' and 'Evangeline.'

Silver Flora Medal.

To Messrs. R. H. Bath, Wisbech, for daffodils and tulips grown in moss fibre and shell.

Silver Banksian Medal.

To Messrs. Barr, Covent Garden, for early daffodils and Darwin tulips.

Narcissus and Tulip Committee, April 6, 1909.

Mr. H. B. May in the Chair, and twenty-four members present.

The question of the registration of daffodils by the Royal Horticultural Society was again brought up owing to the receipt of a letter from the Midland Daffodil Society referring to this subject. A lengthy discussion followed, but as no satisfactory motion dealing with the matter could be framed it was agreed to further consider the question on May 4.

Awards Recommended :—

Silver Flora Medal.

To Messrs Cartwright & Goodwin, Kidderminster, for a group, including many new varieties of daffodils.

To Messrs. Barr, Covent Garden, for an exhibit of daffodils and tulips.

To Chas. Dawson, Esq., Gulval, Penzance, for a group of the newer daffodils.

Other Exhibits.

Messrs. R. H. Bath, Wisbech: daffodils and tulips.
Messrs. J. Carter, High Holborn: daffodils and tulips.
Miss F. W. Currey, Lismore, Ireland: daffodils.
Messrs. R. Sydenham, Birmingham: daffodils grown in moss fibre.

Narcissus and Tulip Committee, April 20, 1909.

Mr. H. B. May in the Chair, and twenty-two members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Miss F. W. Currey, Lismore, Ireland, for group of 'King Alfred,' 'Lycidas,' 'Mrs. Robert Sydenham,' 'Albatross,' 'Lady of the Snows,' 'Lyric,' 'The Geraldine,' and other varieties of daffodils.

Silver Flora Medal.

To Messrs. Barr, Covent Garden, for daffodils, including a number of choice unnamed seedlings.

To Messrs. Hogg & Robertson, Dublin, for daffodils.

Silver Banksian Medal.

To Messrs. Pope, King's Norton, for a group of the newer trumpet daffodils.

To Messrs. R. H. Bath, Wisbech, for trumpet and double daffodils.

To W. A. Watts, Esq., Bronwylfa, St. Asaph, for daffodils.

To C. Churcher, Esq., Alverstoke, Hants, for daffodils.

First-class Certificate.

To *Narcissus* 'Queen of the West' (votes, 14 for, 0 against). A bold, golden trumpet variety from Messrs. W. T. Ware, Bath. (Fig. 113.)

Other Exhibits.

Mr. F. Lilley, St. Peter's, Guernsey: daffodils.

Mr. H. Hemsley, Crawley: daffodils.

NARCISSUS AND TULIP COMMITTEE, MAY 4, 1909.

Mr. H. B. MAY in the Chair, and twenty members present.

The question of registration was again brought forward for discussion on a motion, "That every person naming a Daffodil seedling and registering it with the Royal Horticultural Society must convey an assurance, accompanied by a description, that the said name represents a new seedling, and must send a registration fee of 2*s*." It was subsequently agreed, "That the whole question of registration be referred to the Classification Sub-Committee to report upon," and that the various Daffodil Societies should be consulted before a registration scheme was finally decided upon.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Messrs. Barr, Covent Garden, for a group, including 'White Lady,' 'Masterpiece,' 'Warley Scarlet,' 'Czarina,' 'Fire Queen,' and other daffodils.

Silver Flora Medal.

To H. W. Phillips, Esq., Olton, for a group of the newer daffodils.

Silver Banksian Medal.

To Messrs. Hogg & Robertson, Dublin, for tulips, including 'Lac van Haarlem,' 'Golden Lion,' 'Water-lily,' 'Clothilde,' and 'La Rêve.'

To Messrs. R. H. Bath, Wisbech, for tulips and daffodils.

To C. H. Cave, Esq., Rodway Hill House, Margotsfield, Bristol, for seedling daffodils.

Other Exhibits.

Rev. G. H. Engleheart: some beautiful new daffodils.
Messrs. William Bull, Chelsea: daffodils and tulips.

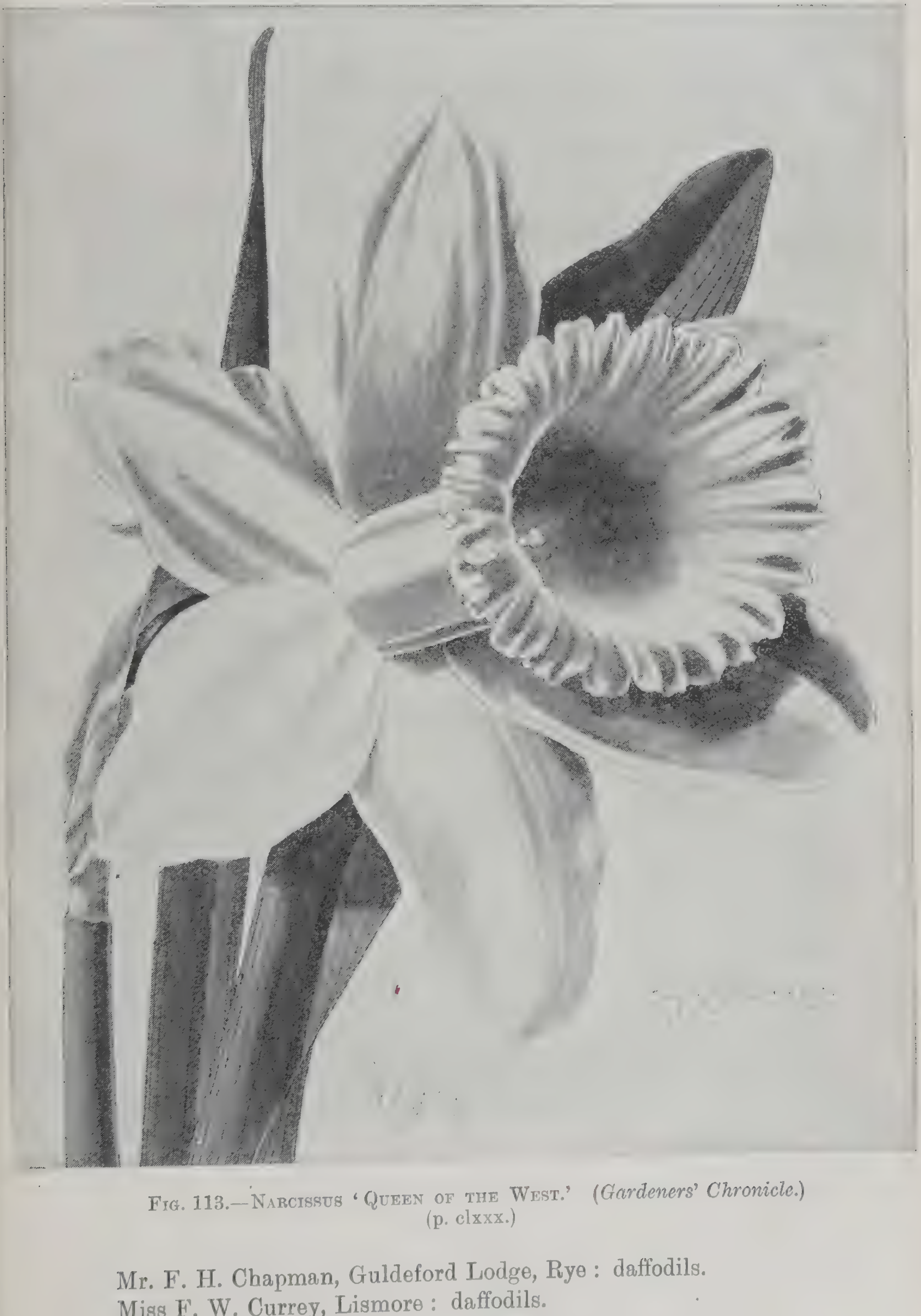


Fig. 113.—Narcissus 'Queen of the West.' (*Gardeners' Chronicle.*)
(p. clxxx.)

Mr. F. H. Chapman, Guldeford Lodge, Rye: daffodils.
Miss F. W. Currey, Lismore: daffodils.

NARCISSUS AND TULIP COMMITTEE, MAY 18, 1909.

Mr. H. B. MAY in the Chair, and seventeen members present.

The proposed new scheme of Classification of the Narcissus, as prepared by the Sub-Committee appointed on March 9, was brought forward, and on behalf of the Sub-Committee its acceptance was formally moved by the Rev. G. H. Engleheart. The scheme was taken section by section, unanimously approved and adopted by the Committee, and sent on to the Council for endorsement.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Sutton, Reading, or May-flowering tulips.

To Messrs. Barr, Covent Garden, for May-flowering, Darwin, and old English florists' tulips.

To Messrs. Cuthbert, Southgate, for late tulips.

To Messrs. Alex. Dickson, Newtownards, Ireland, for tulips, including 'Mr. Farncombe Sanders,' 'Duke of Westminster,' 'Bouton d'Or,' 'May Queen,' 'Inglescombe Pink,' 'Margaret,' &c.

To Messrs. R. Wallace, Colchester, for new and old varieties of late tulips.

Silver-gilt Banksian Medal.

To Messrs. J. Veitch, Chelsea, for May-flowering tulips.

To Messrs. R. H. Bath, Wisbech, for tulips, yellow varieties predominating.

Silver Flora Medal.

To Messrs. Hogg & Robertson, Mary St., Dublin, for tulips.

Silver Banksian Medal.

To Lord Hillingdon, Uxbridge (gr., Mr. A. R. Allan), for tulips.

To the Rev. Canon Fowler, Earley Vicarage, Reading, for late tulips.

To Messrs. William Bull, Chelsea, for tulips.

Award of Merit.

To Tulip 'The President' (votes, unanimous). A shapely May-flowering variety, bright red, suffused with orange, from Messrs. R. Wallace, Colchester.

ESTABLISHED
1804.

INCORPORATED
1809.

TELEGRAMS:
"HORTENSIA, LONDON."

TELEPHONE:
5363 WESTMINSTER

ROYAL HORTICULTURAL SOCIETY,

VINCENT SQUARE, WESTMINSTER, S.W.

NOTICES TO FELLOWS.

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36. Monograph on Fungoid Pests.
37. Rules for Judging, 1909 Code.
38. Spraying of Fruit Trees.
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41. Advertisements.

1. GENERAL.

Notices to Fellows are always added at the end of each number of the JOURNAL, immediately preceding the Advertisements; also at the beginning both of the "Book of Arrangements" and of the "Report of the Council." Fellows are particularly requested to consult these Notices, as it would often save them and the Secretary much unnecessary correspondence.

2. LETTERS.

All letters on *all* subjects should be addressed—The Secretary, Royal Horticultural Hall, Vincent Square, Westminster, S.W.

3. TELEPHONE AND TELEGRAMS.

Telephone Number: **5363 WESTMINSTER.**
"**HORTENSIA, LONDON,**" is sufficient address for telegrams.

4. JOURNALS WANTED.

The Secretary would be greatly obliged by the return to the Society of ANY NUMBERS of the JOURNAL which may be of no further use to Fellows. Complete sets are occasionally applied for, but, at the present moment, not even one can be supplied owing to the stock of the following being exhausted:—

VOLUME X.
VOLUME XIII. Part 1.

These are therefore particularly asked for.

5. SUBSCRIPTIONS.

All Subscriptions fall due on January 1st of each year. To avoid the inconvenience of remembering this, Fellows can *compound* by the payment of one lump sum in lieu of all further annual payments; or they can, by applying to the Society, obtain a form of instruction to their bankers to pay for them every January 1st. It may be a week or more before the Tickets reach the Fellow, owing to the very large number, over 20,000, to be despatched within the first month of the year. Fellows who have not already given an order on their bankers for the payment of their subscriptions each year are requested to do so, as this method of payment is preferred, and saves the Fellows considerable trouble. Forms for the purpose may be obtained from the R.H.S. Offices at Vincent Square, Westminster, S.W. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

In paying their subscriptions, Fellows often make the mistake of drawing their cheques for Pounds instead of for Guineas. Kindly note that in all cases it is Guineas, and not Pounds. Cheques and Postal Orders should be made payable to "The Royal Horticultural Society" and crossed "London County and Westminster Bank, Victoria Branch, S.W."

6. FORM OF BEQUEST.

I give and bequeath to the Treasurer for the time being of the Royal Horticultural Society, London, the sum of £ , to be paid out of such part of my personal estate as I can lawfully charge with the payment of such legacy, and to be paid free of legacy duty, within six months of my decease; the receipt of such Treasurer to be a sufficient discharge for the same. And I declare that the said legacy shall be applied towards [the general purposes of the Society].*

7. PRIVILEGES OF CHEMICAL ANALYSIS.

Instructions are contained at page 74 in the "Book of Arrangements," 1909.

8. LIST OF FELLOWS.

A list of all the Fellows of the Society is sent out in January. Fellows are requested to look at their own names in it, and if in any way these are incorrect, or the addresses insufficient, they are requested to inform the Secretary at once. Forms of Nomination, and of the Privileges of Fellows, are bound in with every number of the JOURNAL and the "Book of Arrangements."

9. NEW FELLOWS.

The President and Council fully appreciate how much the prosperity of the Society and its present large number of Fellows is due to the efforts of Fellows to enlist the sympathy of their friends; and the steady advance during recent years indicates the increasing recognition of the Society's work and usefulness. But it must not be supposed that a maximum has yet been reached. There is ample room for a great increase of Fellows, in the North of England especially, as well as in America and the Colonies.

10. POPPY SEED.

The Secretary will be pleased to send a packet of his 1909 crop of Shirley Poppy Seed to any Fellows who like to send to Rev. W. Wilks, Shirley Vicarage, Croydon, a stamped envelope ready addressed to themselves. The seed should be sown as early as possible in March. This is an offer made by the Secretary in his private capacity, and it causes much inconvenience when requests for seed are mixed up with letters sent to the office in London instead of as above directed.

11. AN APPEAL.

What has been accomplished for the Society since 1887 is largely due to the unwearied assistance afforded by a small proportion of the Fellows; but as all belong to the same Society, so it behoves each one to do what he or she can to further its interests, especially in:—

1. Increasing the number of Fellows.
2. Helping to swell the General Prize Fund started by Mr. A. W. Sutton, V.M.H., for providing Prizes for the Students at Wisley; and also the special Nicholson Memorial Prize Fund.
3. Lectures with lantern slides.

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* Any special directions or conditions which the testator may wish to be attached to the bequest may be substituted for the words in brackets.

4. Books are required to fill the gaps in the Library both at Vincent Square and at Wisley.

5. New and rare Plants and Seeds are wanted for the Garden and surplus roots for distribution to the Fellows.

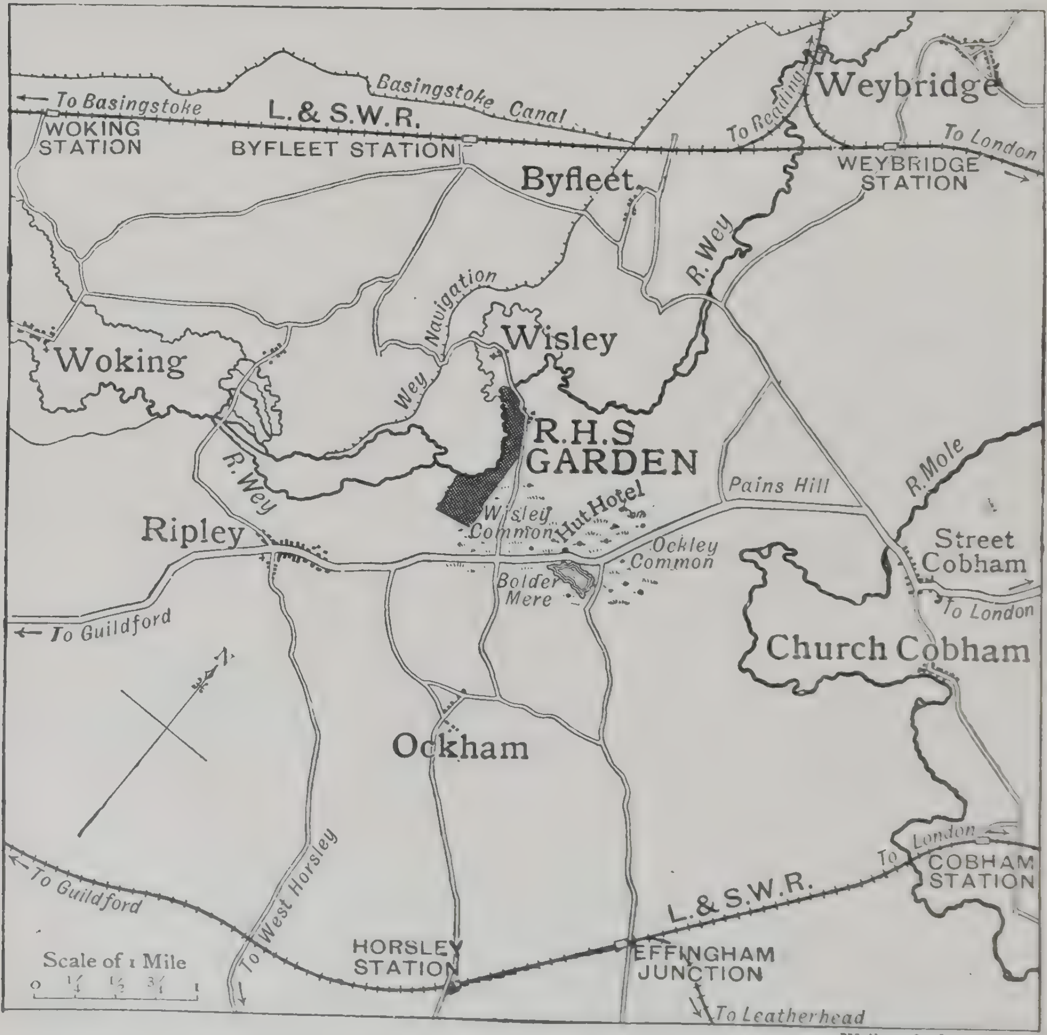
6. Assisting in making Abstracts for the JOURNAL.

Thus there is plenty for all to do according to their individual liking: personal effort, money, plants, books, are all alike needed. The Secretary, therefore, asks those who read these lines to do their best to help in any of the ways above indicated.

Since this paragraph last appeared 200 excellent plants of Vanda coerulea have been given to the Society by Lieut.-Col. Rippon; and lantern slides from Mr. Jas. Hudson, V.M.H., and from Mr. Arnett, of Corbridge—the gifts being most acceptable ones. The offer of a Prize of £5 by Mrs. G. F. Wilson, of Weybridge, for the Wisley Students is also acknowledged with much appreciation. It will be awarded to the best collection of Plants and Insects.

12. THE SOCIETY'S GARDENS AT WISLEY.

The Gardens are open daily to Fellows and others showing Fellows' Transferable Tickets from 9 A.M. till sunset, except on Sundays, Good



Walker & Cockerell sc.

POSITION OF THE SOCIETY'S GARDENS

Friday, Christmas Day, and Exhibition days. Each Fellow's ticket admits three to the Gardens. The Public are not admitted.

The Gardens, situated at Wisley (about 2 miles from Ripley, in Surrey), are about 3 miles from Byfleet, 3½ miles from Horsley, and 5½ miles from Weybridge, all stations on the South-Western Railway, with frequent trains from Waterloo and Clapham Junction. Carriages to convey four persons can be obtained by writing to Mr. D. White, fly proprietor, Ripley, Surrey; the charge being, to and from Weybridge, waiting two hours at the Gardens, 8*s.*; or waiting three hours, 10*s.*; or to and from Horsley, 7*s.*; Effingham Junction, 7*s.*; Byfleet, 7*s.* Visitors should in all cases be careful to state the trains they intend to arrive by and leave by. Carriages can also be obtained at Weybridge for 8*s.* by writing to Mr. Trembling, New Road, Weybridge. Excellent accommodation and refreshments can be had at the Hut Hotel, close to the Gardens, and also at the Hautboy at Ockham.

13. TRIALS AT WISLEY IN 1910–11.

Trials of the following Fruits, Flowers, and Vegetables at the Wisley Gardens during 1910–11 have been arranged:—

N.B.—Everything sent for trial *must be named*, and the name and address of the Sender attached.

Fruit.—Strawberries, autumn fruiting. 20 runners of each.

Flowers.—Early-flowering outdoor Chrysanthemums. 2 plants of each to be sent in April.

Clematis. 2 plants of each early in April.

Gladioli, early, mid-season, and late. 4 bulbs of each early in February.

Rhododendrons, early, mid-season, and late. 2 plants of each in February or March.

Vegetables.—Potatos; each variety must be labelled as being "early," "mid-season," or "late." 20 tubers of each to be sent by February. Also experiments with "Ashleafs" of all forms (20 tubers), secured from as many varying sources as possible, under different soil and climatic conditions. Please send particulars of soil and climate.

Salads, of all kinds and varieties. ¼ oz. of each, early in February.

Peas. ½ pint of each, early February.

Spinach. ½ oz. of each, early February.

All parcels should be addressed:—If sent by post: The Superintendent, R.H.S. Gardens, Wisley, Ripley, Surrey.

If by rail: The Superintendent, R.H.S. Gardens, Wisley, Horsley Station, L. & S.-W. R., with advice by post to the Superintendent.

SEEDS SENT FOR TRIAL OTHER THAN THOSE INVITED IN THE ABOVE LIST.

1. Seeds, &c., of plants not included in the Annual Trial List will also be received and grown, as far as possible.

2. The Superintendent is instructed, in the case of all seeds thus sent and grown, to procure seeds of the already best existing similar varieties, and grow them alongside of the newly sent seeds.

3. The resulting plants, &c., will be from time to time (as convenient) submitted to the Committee meeting at Wisley, but the only awards made to such unsolicited plants will be "Commended" and "Highly Commended."

4. Any plants thus grown and tried will have perfect freedom to be re-tried whenever a regular fixed trial of their congeners takes place, which will, as far as practicable, be at intervals of two or three years.

14. THE WISLEY RESEARCH STATION.

The new Research Station and Laboratory at Wisley is now completed and work is in progress there. Mr. F. J. Chittenden, F.L.S., has been appointed Director of the Research Work on Scientific Matters affecting Practical Horticulture, and Lecturer to the Students. By the completion of this station a long-felt want has been met. In the United States, where so much good work has been done in this direction, all is paid for by the Government, but in this country we have to fall back on private individuals or on Societies.

15. STUDENTS AT WISLEY.

The Society admits young men, between the ages of 16 and 22 years, to study Gardening at Wisley. The curriculum now includes not only practical garden work in all the main branches of Horticulture, but also lectures, demonstrations, and elementary Horticultural Science in the Laboratory, whereby a practical knowledge of simple Garden Chemistry, Biology, &c., may be obtained. The Laboratory is equipped with the best apparatus procurable for Students. The training extends over a period of two years, with a progressive course for each year. Students can only enter at the end of September and at the end of March. Selected Students have also the advantage of attending certain of the Society's Shows and Lectures in London.

16. DISTRIBUTION OF SURPLUS PLANTS.

In a recent Report the Council drew attention to the way in which the annual distribution of surplus plants has arisen. In a large garden there must always be a great deal of surplus stock, which must either be given away or go to the waste heap. A few Fellows, noticing this, asked for plants which would otherwise be discarded; and they valued what was so obtained. Others hearing of it asked for a share, until the Council felt they must either systematize this haphazard distribution or else put a stop to it altogether. To take the latter step seemed undesirable. Why should not such Fellows have them as cared to receive such surplus plants? It was therefore decided to keep all plants till the early spring, and then give all Fellows alike the option of claiming a share of them by ballot.

Fellows are therefore particularly requested to notice that only waste and surplus plants raised from seeds or cuttings are available for distribution. Many of them may be of very little intrinsic value, and it is only to avoid their being absolutely wasted that the distribution is permitted. The great majority also are of necessity *very small*, and may require careful treatment for a time.

Fellows are particularly requested to note that a Form of Application and list to choose from of the plants available for distribution is sent in January *every year* to every Fellow, enclosed in the "Report of the Council." To avoid all possibility of favour, all application lists are kept until the last day of February, when they are all thrown into a Ballot; and as the lists are drawn out, so is the order of their execution, the plants being despatched as quickly as possible after March 1.

Of some of the varieties enumerated the stock is small, perhaps not more than twenty-five or fifty plants being available. It is therefore obvious that when the Ballot is kind to any Fellow he will receive the majority of the plants he has selected, but when the Ballot has given him an unfavourable place he may find the stock of almost all the plants he has chosen exhausted. A little consideration would show that all Fellows cannot be first, and some must be last, in the Ballot. Application forms received after March 1 and before April 30 are kept till all those previously received have been dealt with, and are then balloted in a similar way. Fellows having omitted to fill up their application form before April 30 must be content to wait till the next year's distribution. The work of the Gardens cannot be disorganized by the sending-out of plants at any later time in the year. All Fellows can participate in the annual distribution *following* their election.

The Society does not pay the cost of packing and carriage. The charge for this will be collected by the carriers on delivery of the plants, which will be addressed exactly as given by each Fellow on his application form. It is impracticable to send plants by post, owing to the lack of Post Office facilities for despatch without prepayment of postage.

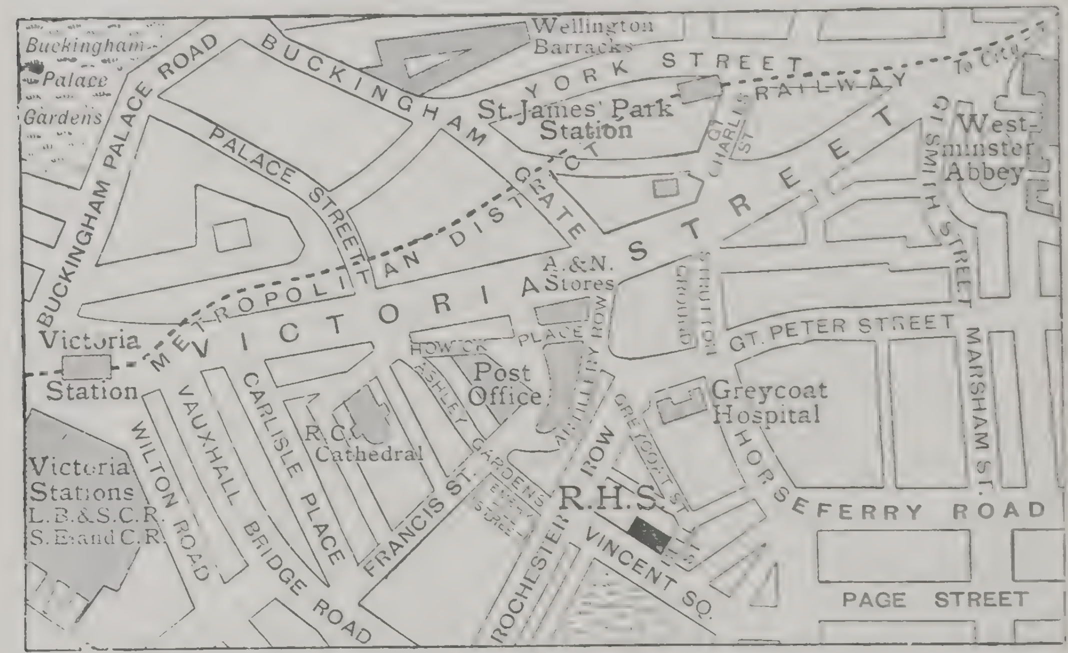
Fellows residing beyond a radius of thirty-five miles from London are permitted to choose double the number of plants to which they are otherwise entitled.

Plants cannot be sent to Fellows residing outside the United Kingdom, owing either to length of time in transit or to vexatious regulations in some foreign countries; but the Council will at any time endeavour to obtain for Fellows living abroad any unusual or rare seeds which they may have been unable to procure in their own country.

17. LETTING OF THE SOCIETY'S HALL.

The Royal Horticultural Hall and Offices are situated in Vincent Square, which lies straight through Ashley Gardens from Victoria Street, Westminster, and is about five minutes' walk from the Victoria and St. James's Park Stations.

Fellows are earnestly requested to make known among their friends and among other institutions that the ROYAL HORTICULTURAL HALL is available for Meetings, Shows, Exhibitions, Concerts, Conferences, Lectures, Balls, Banquets, Bazaars, Receptions, and other similar purposes. The Hall has a floor surface of 13,000 square feet. It is cool in summer and warm in winter. For a Concert it will seat 1,500, or for a public meeting 1,800. A Sound Board has recently been added, by which the acoustic properties are very greatly improved. It is undoubtedly the lightest Hall in London. The first floor, consisting of four rooms, may also be hired for similar purposes, either together or separately. A long-felt want has now been met by the construction of a convenient kitchen in the basement, with lift connections to the eastern annexe and lecture room. For serving luncheons, &c., this will prove a great boon. Ample cloak-rooms for ladies and for gentlemen are available. The regulations, &c., for hiring the Hall are printed in the "Book of Arrangements," and full particulars may be obtained on application to the Secretary, R.H.S., Vincent Square, Westminster, S.W., with whom dates may be booked.



Position of the Society's Hall.

18. EXHIBITIONS, MEETINGS, AND LECTURES IN 1910.

The programme will be issued in the "Book of Arrangements" for 1910, and will be sent to every Fellow at the end of January. An Exhibition and Meeting is held practically every fortnight throughout the year, and a short lecture on some subject connected with Horticulture is delivered during the afternoon.

A reminder of every Show will be sent in the week preceding to any Fellow who will send to the R.H.S. Offices, Vincent Square, S.W., a sufficient number (32) of halfpenny cards *ready addressed* to himself.

The following are the dates fixed for 1910 :—

Jan. 11, 25
Feb. 8, 22
March 8 and 9 (Bulbs), 22
April 5, 19
May 3, 17, 24 to 26 (Temple Show)
June 7, 21
July 5, 19
August 2, 16, 30
Sept. 13, 27
Oct. 11 (with Vegetables), 13 and 14 (Fruit Show), 25
Nov. 8, 22
Dec. 6

19. ERROR IN FELLOWS' TICKETS.

The entry of a Show on December 21 which appears on the Fellows' Tickets is an error. There will be no Show on that date, as it is found to be too near to Christmas.

20. BRITISH FRUIT AND VEGETABLES.

In 1910, instead of the system of scattering the prizes offered all through the year, they will be concentrated on two meetings, the Vegetable prizes being combined with the ordinary meeting on October 11, and the Fruit on October 13 and 14. The Schedules of the Prizes will be issued early in the Spring.

21. AFFILIATED SOCIETIES' CHALLENGE CUP.

The Council offer a Challenge Cup to be competed for annually by the Affiliated Societies, subject to certain conditions (for which see "The Book of Schedules," 1909). The winners will hold the Cup for one year, and will also receive a Silver-gilt Knightian Medal. The Cup can only be won by the same Society every fourth year, but the Society can compete every year and can win any second or third prize if offered.

22. "BOOK OF SCHEDULES."

The 1910 "Book of Schedules," containing revised Rules and Regulations for Exhibitors, &c., and full details of the Temple and Summer Shows, Colonial Fruit, and Bottled Fruit Shows, and a complete Schedule with Regulations for the great Autumn Fruit Show, will be ready for issue in March, price 6*d.*, and on receipt of this amount a copy will be forwarded by post immediately.

23. BOTTLED BRITISH FRUITS, &c., SHOW.

The Annual Exhibition of British Bottled Fruits will be held on December 1 to 4, 1909. Prizes and Medals are offered. See "Book of Schedules," 1909.

24. COLONIAL-GROWN FRUIT SHOW, 1909.

An Exhibition of Colonial-grown Fruits and Vegetables will be held on December 1 to 4, 1909.

In holding this Show the Society's sole object is the advancement of the interest of the Colonies (*a*) by stimulating the production of better fruits; (*b*) by giving advice in the difficulties confronting Fruit Growers; and (*c*) by helping to inform the home market. Fruit Growers in the Colonies are asked to assist their own future competition in the markets of Great Britain by sending exhibits to this Exhibition, invitations to which are given to the Colonial and Government Offices, the Embassies, the leading London Fruit Merchants, Colonials on furlough, and others.

Particulars of the Show will be found in the "Book of Schedules" for 1909.

25. SHOWS OF KINDRED SOCIETIES IN 1909.

The following dates have been fixed, on which R.H.S. Fellows' tickets will admit:—

March 24.—Perpetual Flowering Carnation Society.
April 20.—Auricula and Primula Society.
May 18.—Tulip Society.
July 21.—Carnation and Picotee Society.
July 23.—Sweet Pea Society.
September 16.—Rose Society.
December 8.—Perpetual Flowering Carnation Society.

Copies of the Schedules for these Shows may be obtained from the Honorary Secretary of each Society. For names and addresses see above dates in the "Book of Arrangements," 1909.

26. FORCED BULB SHOW, MARCH 8 AND 9, 1910.

The pronounced success of the Spring Bulb Show of 1909 has induced the Council to make a two-days' Exhibition of Forced Bulbs, etc., on March 8 and 9, 1910. The object of this Show is to demonstrate the best varieties suited for gentle forcing, and exhibits of small collections are invited from amateurs, as well as of larger ones from the trade. Medals will be awarded according to merit. For the special competitions on these dates, see under "Special Prizes" following.

27. SPECIAL PRIZES.

1909.

(1) Apples and Pears.

The Worshipful Company of Fruiterers have presented the following prizes, which the Council have accepted and propose to award as follows:—

November 23: the Company's medals for (*a*) three dishes of Dessert and six of Cooking Apples, distinct; and for (*b*) seven dishes of Dessert and two of Cooking Pears, distinct. (See "Book of Schedules.")

Home-Bottled Fruits.

The Council have accepted the offer of a Mercia Sterilizer from Miss Edith Bradley for award at the Show of Home-Bottled Fruits to be held on December 1 to 4, 1909. (See "Book of Schedules.")

1910.

(1) Challenge Cup for Affiliated Societies. (See p. cxci.)

(2) Apple 'Encore.'

Messrs. Cheal have intimated their willingness to present to the Society a series of seven prizes for a dish of the new Apple 'Encore,' to be awarded at the great Autumn Show of British-grown Fruits in October 1910. First, 20*s.*; second, 17*s.* 6*d.*; third, 15*s.*; fourth, 12*s.* 6*d.*; fifth, 10*s.*; sixth, 7*s.* 6*d.*; seventh, 5*s.*

(3) Forced Hyacinths.

The Council of the Royal Horticultural Society have accepted the offer of the following prizes from the General Bulb Growers' Society at Haarlem, to be competed for in March 1910:—

Division I.—For Amateurs and Gentlemen's Gardeners.

Class 3.—Eighteen Hyacinths, distinct.

1st Prize	£6 6*s.*	4th Prize	£3 3*s.*
2nd ,,	£5 5*s.*	5th ,,	£2 2*s.*
3rd ,,	£4 4*s.*	6th ,,	£1 1*s.*

Class 4.—Twelve Hyacinths, distinct.

1st Prize	£5 5*s.*	4th Prize	£2 2*s.*
2nd ,,	£4 4*s.*	5th ,,	£1 1*s.*
3rd ,,	£3 3*s.*		

Class 5.—Six Hyacinths, distinct.

1st Prize	£2 2*s.*	3rd Prize	£1 1*s.*
2nd ,,	£1 10*s.*	4th ,,	£0 10*s.*

Class 6.—Four pans containing Hyacinths, ten roots of one variety in each pan. The blooms of each pan to be of distinctly different colour to those of the other three pans. The bulbs need not have been actually grown in the pans they are shown in.

1st Prize	£4 4*s.*	3rd Prize	£2 2*s.*
2nd ,,	£3 3*s.*	4th ,,	£1 1*s.*

Division II.—For Trade Growers.

Class 7.—Collection of 200 Hyacinths, in at least 36 varieties, grown in pots or glasses.

Prize. The Gold Medal of the General Bulb Growers' Society at Haarlem.

Class 8.—Collection of 200 Hyacinths, in 20 varieties, in pans ; 10 roots of one variety in each pan. The bulbs need not have been actually grown in the pans they are shown in.

Prize. The Gold Medal of the General Bulb Growers' Society at Haarlem.

Regulations.—For Classes 3, 4, and 5, each bulb must be in a separate pot (size optional). Classes 3, 4, 5, and 6 must all be single spikes ; no spikes may be tied together. Exhibitors may only compete in one of the Classes numbered 3, 4, and 5.

All the bulbs must have been forced entirely in Great Britain or Ireland.

(4) BULBS GROWN IN MOSS FIBRE, ETC.

The Council also offer the following prizes presented to them by Mr. Robert Sydenham :—

Classes 9, 10, and 11.—Bulbs grown in moss fibre or similar material (not earth), and without drainage. Amateurs and gentlemen's gardeners.

Class 9.—Six single Hyacinths, in separate vases, not exceeding six inches in diameter, to be selected from any one of the following varieties : 'Innocence,' 'Isabella,' 'Jacques,' 'Johan,' 'King of the Blues,' 'Koh-i-Noor,' 'Ornament Rose,' 'Princess May,' 'Queen of the Blues,' 'Roi des Belges,' 'Rose à Merveille,' 'Schotel.'

Prizes, 25*s.* ; 21*s.* ; 15*s.* ; 10*s.* 6*d.* ; 7*s.* 6*d.*

Class 10.—Six vases of Tulips (vases not exceeding seven inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following : 'Duchess de Parma,' 'Duzart,' 'Fabiola,' 'Joost van Vondel,' 'Keizerskroon,' 'Mon Tresor,' 'Prince of Austria,' 'Rose Gris de Lin,' 'Thomas Moore,' 'Van der Neer,' 'Vermillion Brilliant,' 'White Pottebakker.'

Prizes, 25*s.* ; 21*s.* ; 15*s.* ; 10*s.* 6*d.* ; 7*s.* 6*d.*

Class 11.—Six vases of Narcissi (vases not exceeding seven inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following : 'Beatrice,' 'Beauty,' 'C. J. Backhouse,' 'Emperor,' 'Frank Miles,' 'Glitter' 'Horace,' 'Leonie,' 'Lilian,' 'Lulworth,' 'Madame de Graaff,' 'Phyllis,' 'Victoria,' 'White Lady.'

Prizes, 25*s.* ; 21*s.* ; 15*s.* ; 10*s.* 6*d.* ; 7*s.* 6*d.*

If there are more than seven exhibits in either of the Classes 9, 10, and 11, an extra prize of 7*s.* 6*d.* will be awarded.

(5) Prizes for Amaryllis.

The Council offer (subject to their general rules) the following Prizes presented to them by the Messrs. Robt. P. Ker and Sons.

Class 12.—Twelve pots of Amaryllis (Hippeastrum), distinct. Each pot must contain one bulb only. Size of pots optional. Amateurs.

Prizes, £3 ; £2 ; £1.

28. LECTURES.

The new Lecture Room is fitted with an electric lantern of the most modern construction; electric current, gas, and water are laid on, and every provision has been made for the illustration and delivery of Lectures.

Any Fellows willing to Lecture, or to communicate Papers on interesting subjects, are requested to communicate with the Secretary.

29. "THE MASTERS LECTURES."

Fellows will remember the intimate connection with the Society of the late Dr. Masters, F.R.S., who did much for horticulture by drawing constant attention to the various ways in which scientific discovery and research might be made serviceable to gardening; and it will also be remembered that a fund was established by subscription to perpetuate his memory in connection with the Society and to carry on in some degree his work of science in relation to gardening.

"The Masters Lectures" have accordingly been founded, and the first two were given during 1909 by the well-known Professor Hugo de Vries, of Amsterdam.

In 1910 Mr. A. D. Hall, M.A., F.R.S., will be the Masters Lecturer on February 22 and March 22. His subject is, "The Adaptation of the Plant to the Soil."

30. EXAMINATIONS, 1910.

1. The Annual Examination in the Principles and Practice of Horticulture will be held on Wednesday, April 20, 1910. The examination has two divisions, viz. (a) for Candidates of eighteen years of age and over, and (b) for Juniors *under* eighteen years. Candidates should send in their names not later than March 30. Full particulars may be obtained by sending a stamped and directed envelope to the Society's Offices. Copies of the Questions set from 1893 to 1909 (price 2*s.* post free) may also be obtained from the Office. The Society is willing to hold an examination wherever a magistrate, clergyman, schoolmaster, or other responsible person accustomed to examinations will consent to supervise one on the Society's behalf.

The Society is prepared to extend this examination to residents in the Colonies; and, at the request of the Government of the United Provinces of India, this test was held in 1909—altered and adapted to the special requirements of India—at Saharanpur and Calcutta.

In connection with this examination a Scholarship of £25 a year for two years is offered by the Worshipful Company of Gardeners, to be awarded after the 1910 examination to the student who shall pass highest, if he is willing to accept the conditions attaching thereto. The main outline of these conditions is that the holder must be of the male sex, and between the ages of 18 and 22 years, and that he should study gardening for one year at least at the Society's Gardens at Wisley, conforming to the general rules laid down there for Students. In the second year of the Scholarship he may, if he like, continue his studies at some other place at home or abroad which is approved by the Council of the Society. In case of two or more eligible Students being adjudged equal, the Council reserve to themselves the right to decide which of them shall be presented to the Scholarship.

2. The Society will hold an Examination in Cottage Gardening on Wednesday, April 27, 1910. This examination is intended for, and is confined to, Elementary and Technical School Teachers. It is undertaken in view of the increasing demand in country districts that the Schoolmaster shall be competent to teach the elements of Cottage Gardening, and the absence of any test of such competence. The general conduct of this examination will be on similar lines to that of the more general examination. Questions on Elementary Chemistry and Biology are now added to this examination.

3. The Society will hold an examination in the Royal Horticultural Hall, Vincent Square, S.W., on Monday, January 10, 1910, for gardeners employed in Public Parks and Gardens belonging to County Councils, City Corporations, and similar bodies. The entries close on January 1, 1910.

Medals and Certificates are awarded and Class Lists published in connection with these examinations. The Syllabus may be obtained on application to the Secretary R.H.S., Vincent Square.

31. INFORMATION.

Fellows may obtain information and advice from the Society as to the names of flowers and fruit, on points of practice, insect and fungoid attacks, and other questions by applying to the Secretary R.H.S., Vincent Square, Westminster, S.W. Where at all practicable it is particularly requested that letters and specimens may be timed to reach Vincent Square by the first post on the mornings of the Fortnightly Meetings, so as to be laid before the Scientific or other Committees at once.

32. INSPECTION OF FELLOWS' GARDENS.

The Inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz. a fee of £3 3*s*. for one day (or £5 5*s*. for two consecutive days), together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their gardens. Gardens can only be inspected at the *written* request of the *owner*.

33. AFFILIATION OF LOCAL SOCIETIES.

One of the most successful of the many new branches of work undertaken since the reconstruction of the Society in 1887 is the unification of local Horticultural Societies by a scheme of affiliation to the R.H.S. Since this was initiated no fewer than 200 Societies have joined our ranks, and the number is steadily increasing.

The Parent Society is this year offering a Silver Challenge Cup to be competed for by Affiliated Societies. (See "Book of Schedules," under date October 12.)

To the privileges of Affiliated Societies have been added all the benefits accruing under the scheme recently introduced for the Union of Horticultural Mutual Improvement Societies.

Secretaries of Affiliated Societies can obtain on application a specimen of a Card which the Council have prepared for the use of Affiliated Societies for Certificates, Commendations, &c. Price 3*s.* 6*d.* for 10 copies, 5*s.* 6*d.* for 20, 11*s.* 6*d.* for 50, 20*s.* for 100.

The Council have also struck a special Medal for the use of Affiliated Societies. It is issued at cost price in Bronze, Silver, and Silver-gilt—viz. Bronze, 5*s.* 6*d.*, with case complete; Silver, 12*s.* 6*d.*, with case complete; Silver-gilt, 16*s.* 6*d.*, with case complete. Award Cards having the Medal embossed in relief can be sent with the Medal if ordered, price 6*d.* each.

34. UNION OF HORTICULTURAL MUTUAL IMPROVEMENT SOCIETIES.

This Union has been established for the encouragement and assistance of Horticultural Mutual Improvement Societies, the object being to strengthen existing Societies, to promote interchange of lecturers, to provide printed lectures, and if possible to increase the number of these useful Societies.

A list of lecturers and their subjects, and also a list of typewritten lectures, with or without lantern slides, prepared by the Society, may be obtained from the Secretary R.H.S., price 3*d.*

The Secretary will be glad to hear from lecturers who are willing to lecture to such Societies, that he may enroll them in the Register of Lecturers and bring them into touch with Societies requiring assistance. Others may like to send to him written lectures (with or without lantern slides), that he may have them printed for circulation among these Societies.

Lantern slides on horticultural topics are urgently needed, and their gift will be very much appreciated.

35. COLOUR CHART.

Hardly a gardener or florist exists who has not at times longed for a Colour Chart—that is to say, for a standard of reference whereby he could himself name, or recognize, or convey to a friend at a distance, the *exact* shade of colour of a flower he desired to procure or had seen advertised, or wished to commend to a friend. Take, for example, the word "crimson"; what a multitude of colours and shades it may be made to include! Some, very beautiful; some, horrible concoctions of red and blue crudely combined.

The Council of the Society have long felt the need of such a Colour Chart, but the huge expense of production has hitherto deterred them from issuing it.

Not long since an admirable chart, containing more than 1,450 shades of colour between white and black, was published at the instance of the French Chrysanthemum Society, the price being £1 1*s*. net, and by it it is now possible to *exactly* recognize or describe to a friend or purchaser at a distance the precise colour of any possible flower. You may have met with an Azalea, for instance, which greatly strikes your fancy; you take out your Chart and match its shade, and describe it to your friend or your nurseryman as, "Colour: Apricot, p. 53, shade 3," and he turns to his Chart and sees *exactly* what it is you want or describe. Or you want to make someone understand the exact shade of a rose in the way of "Andersoni," and you need only say, "Rosy pink, p. 118, shade 4," and your correspondent turns to his Chart and sees in a moment exactly what it is you want to describe. Or a nurseryman, having raised a new variety, can by simply quoting "Colour Chart, p. —, shade —," exactly represent to his customers the colour-beauty of his new introduction.

The Council recognizing both the excellence and the usefulness of this Chart, the idea at once occurred: Could it not be adopted as an International Standard, so that all lovers of flowers all over the world could accurately and exactly describe to one another (no matter how far away or speaking what language) the colour and shade of any particular flower they refer to? There seemed no other difficulty than the somewhat prohibitive cost of £1 1*s*. net. But difficulties only exist to be overcome, and by undertaking to be responsible for a very large number the Society is now in a position to offer this Chart to its Fellows at the reduced cost of 14*s*. 6*d*., for which price it can be obtained at the Society's Offices, Vincent Square, or it can be sent free by post for 15*s*.; but in all cases a cheque or postal order must be sent beforehand.

This Chart will, of course, be found vastly useful for many other purposes; for example, a lady wishing to match a certain shade has only to refer her dressmaker to such and such a colour on p. —, shade —, and it can be infallibly matched. An artist wishing to describe the colour of the sky on a certain sundown can do so exactly by reference to the Chart. And in many other like ways it must prove generally useful, containing as it does every possible shade of colour between black and white.

The Chart is being adopted extensively by dyers, mercers, drapers.

and others, in all countries, as a result of its introduction through our Society.

The Council hope that Fellows will avail themselves freely of this offer, as there is now a real prospect of its being very widely adopted as a regular International standard. It should be quoted as "The Royal Horticultural Society's Colour Chart."

36. MONOGRAPH ON FUNGOID PESTS.

The attention of Fellows is directed to a handsome volume published by the Society on "Fungoid Pests of Cultivated Plants," by Dr. M. C. Cooke, V.M.H. It consists of 280 pages of letterpress, and is illustrated with 24 coloured plates, containing figures of 360 different fungoid attacks, and 23 woodcuts. It also contains a Chapter on Fungicides, which explains clearly how to make the different washes and sprays, and gives the proportions in which the various ingredients should be used. The whole work is written so as to interest and instruct the cultivator in the simplest and most practical manner. The volume makes an admirable school prize or gift to a gardener or student of nature. Price 5*s.*, R.H.S. Office, Vincent Square.

"No one whose plants are subject to fungoid attacks—and whose are not?—should be without this book; for not only can they by its use identify the disease at once, but they are also told both how to treat it and overcome it, and also how to make the different washes and sprays which the different classes of fungoid attacks require."

37. RULES FOR JUDGING—1909 CODE.

The "Rules for Judging, with Suggestions to Schedule Makers and Exhibitors," have again been further revised and considerably modified from the experience gained during the last few years. Special attention is drawn to the amended Rule defining "an amateur," with suggestions for establishing four distinct classes of amateurs to meet the requirements of larger or smaller local Societies. The "pointing" recommended for fruits and vegetables has also been considerably amended, and the terms "annuals" and "biennials" further explained. The secretaries of local Societies are advised to obtain a fresh copy. It will be sent post free on receipt of a postal order for 1*s.* 6*d.*, addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W.

38. SPRAYING OF FRUIT TREES.

The Report of the Conference on the Spraying of Fruit Trees, held in the R.H.S. Hall on October 16, 1908, is now issued in book form, and may be obtained at the Society's offices, Vincent Square, Westminster, price 1*s.* The book deals with the methods of spraying fruit trees for both insect and fungus pests, with information as to washes and spraying machinery, and forms the latest collated information on this subject.

39. VARIETIES OF FRUITS.

Many people plant Fruit trees without a thought of what Variety they shall plant, and as a result almost certain disappointment ensues, whilst for an expenditure of 2*d*. they can obtain from the Society a little 16-page pamphlet which contains the latest expert opinion on Apples, Pears, Plums, Cherries, Raspberries, Currants, Gooseberries, and Strawberries, together with Notes on Planting, Pruning, and Manuring, which for clearness of expression and direction it would be impossible to surpass. It has in fact been suggested that no other 16 pages in the English language contain so much and such definite information. At the end of the pamphlet are given the names of some of the newer varieties of Fruits, which promise well, but are not yet sufficiently proved to be recommended for general planting.

Copies of this pamphlet for distribution may be obtained at the Society's Office, Vincent Square, Westminster. Price, post free: single copy, 2*d*., or 25, 2*s*.; 50, 3*s*.; 100, 4*s*.

40. INTERNATIONAL HORTICULTURAL EXHIBITION.

1911.

PRELIMINARY NOTICE.

The President and Council of the Royal Horticultural Society hope to organize an INTERNATIONAL HORTICULTURAL EXHIBITION in London, in 1911 or 1912.

Definite dates and further particulars will be issued as soon as is possible.

41. ADVERTISEMENTS.

Fellows are reminded that the more they can place their orders with those who advertise in the Society's Publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

TEMPLE SHOW.

May, 25, 26, 27, 1909.

The following awards in the Special Classes for Orchids were inadvertently omitted from the Report on page xciv :—

Class 1b.—*A Group of Orchids (space unrestricted).* Amateurs.

First Prize, Sherwood Cup.—F. Menteith Ogilvie, Esq., Oxford (gr. Mr. Balmforth).

Second Prize, Smaller Cup.—Sir Jeremiah Colman, Bart., V.M.H., Reigate (gr. Mr. J. Collier).

Class 1c.—*A Group of Orchids (space not exceeding* 75 *sq. ft.).* Amateurs.

First Prize, Veitch Memorial Medal and £5.—The Duke of Marlborough, Blenheim (gr. Mr. Hunter).

Second Prize, Small Silver Cup.—Mrs. Kershaw Wood, Glossop (gr. Mr. W. T. Gould).

Class 1d.—*A Group of Orchids (space not exceeding* 35 *sq. ft.).* Amateurs.

First Prize, Silver Cup.—Not awarded.

Second Prize, Silver Flora Medal.—R. Ashworth, Esq., Newchurch, Manchester (gr. Mr. Fletcher).

GENERAL MEETING.

September 14, 1909.

Mr. A. H. Pearson, F.R.H.S., in the Chair.

Fellows elected (2).—C. Cairn, J.P., Mrs. Sandwich.

A lecture on "The Physiology of Pruning" was given by Mr. Edward A. Bunyard, F.R.H.S. (see p. 330).

GENERAL MEETING.

September 28, 1909.

Mr. A. D. Hall, M.A., F.R.S., in the Chair.

Fellows elected (75).—Mrs. Aitcheson, Mrs. Anderson, W. J. Andrews, Mrs. Bailey, Mrs. Cecil Banbury, Miss R. F. Barton, C. E. Bashall, Mrs. H. V. Bastow, James R. Bell, W. Benson, Alex. Bevington, H. A. Bishop, Miss Blathwayt, Mrs. H. Bonham-Carter, Mrs. F. Braund, Mrs. Callwell, B. F. A. Child, Mrs. Godfrey Clark, Mrs. L. S. Cobham, Mrs. Davidson, Mrs. Spofforth Dixon, F. W. Dodds, A. G. DuCane, Miss M. N. East, J. Frost, G. A. Haggie, Mrs. H. F. Halsham, H. Hankey, Miss A. J. Harrison, G. Headland, Sir Clement Hill, K.C.B., K.C.M.G., Vernon F. Hill, J.P., Mrs. Bryer Hinde, W. A. Holmes, Mrs. E. Jeffrey, Mrs. Alex. Johnston, Sydney J. King, J. Latham, Lt.-Col. J. B. Laurie, W. Leggett, R. Cecil Leigh, Sydney F. Lunniss, L. G. M. Mackay, Miss T. H. McMorland, Alex. Malcolm, P. J. Michelli, C.M.G., Mrs. Hughes Morgan, S. H. Motion, Miss M. Oppen, E. J. Owens, Rev. H. C. Thursby Pelham, Miss Gladys Pott, W. T. Pretty, J. M. Price, R. Rabbige, Mrs. W. Renshaw, C. D. Revell, J. Ridley, J. Rowley, R. P. Sellon, Miss Oke Smith, Mrs. G. H. Sprott, Mrs. Steble, Miss A. Steinberg, H. Stredwick, R. Gravenor Strong, W. Swire, Capt. F. C. Theobald, G. C. Tingley, L. G. Trafford, R. Walker, Miss J. Wanklyn, R. Graeme Watt, J. C. Wheeler, W. Wicherley.

Fellows resident abroad (2).—W. H. Lancashire (Guernsey), H. S. Ranford (Australia).

Associates (2).—Miss B. Dell, Miss M. Sowerby.

Society affiliated (1).—Williton and District Horticultural Association.

The second Masters Memorial lecture, on "The Production of Horticultural Varieties," was given by Professor Hugo de Vries (p. 321).

GENERAL MEETING.

October 12, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair.

Fellows elected (27).—Mrs. Beale, Mrs. Bouth, A. Bowker, Mrs. M. Bruce, H. Dales, Hon. Arthur J. Davey, E. H. M. Denny, Mrs. A. H. dePass, W. Dunlop, H. Edgell, J. S. Fisk, H. J. Cray, Sir Daniel F. Goddard, Mrs. F. Hitchcock, Lady A. Acland Hood, Rev. A. Acland Hood, E. Lewis, W. J. Long, Mrs. Noel, Lady Ritchie, Mrs. Rommel, Mrs. T. Simpson, A. C. Smart, J. Stanley, A. Tustin, Lady Wigan, Lady Young.

Associates (3).—Miss H. C. Byles, J. Weedon, Miss J. White.

Societies affiliated (3).—Bradford Horticultural Society, Clive Broughton and Grinshill School Flower Show, Stour Valley Anglo-French Gardening School.

A lecture on "Renaissance Gardens" was given by Mr. T. H. Mawson, Hon. A.R.I.B.A. (see p. 335).

REPORT ON THE ANNUAL CONFERENCE OF AFFILIATED SOCIETIES AND SOCIETIES IN UNION.

October 12, 1909.

The Annual Conference of Affiliated Societies was held on October 12 at the Royal Horticultural Hall, H. B. May, Esq., a Member of the Council, in the Chair.

The results of the discussions upon the various items of the agenda were as follows :—

The Radlett, Aldenham, &c., Society (represented by Dr. Webb, Mr. Nash, and Mr. Stevens) suggested that affiliated societies should organize meetings at a convenient centre in their respective counties, prior to the Annual Conferences, to consider and formulate subjects for discussion thereat. It was thought much good would follow united meetings of societies at one central town in their respective counties, for such purposes as, for example, to arrange subjects for discussion at the Conferences, to arrange united or perhaps county shows, and for mutual help and suggestion in practical organization. It was further suggested that the R.H.S. should arrange these central meetings and county shows.

Mr. May pointed out that it was much easier for the daughter societies themselves to arrange such meetings, as they best knew their most convenient centres, and reference to the Horticultural Directory would indicate their neighbouring societies. As regards county shows, here again the initiative must rest with the local societies, who should first ascertain what financial and other support would be forthcoming, and then if the Council of the R.H.S. was approached with this information, the proposal would be of a more practical nature. Societies must not expect the R.H.S. to do everything ; it is prepared to give all reasonable assistance, but the initiative of any provincial show must come from the county or other leading society of the locality.

St. Barnabas, Sutton, &c., Society (represented by Mr. Churcher, Mr. F. D. Levett, and Mr. P. C. H. Jay) proposed handicapping in Horticultural Competitions. This subject, discussed at the Conference of 1908, was again negatived, the opinion being that it was quite impracticable to restrict an exhibitor to a plot of land of given dimensions for the raising of any particular plants.

The Redhill, Reigate, &c., Association (represented by Mr. W. P. Bound, Mr. F. Herbert, and Mr. W. Rose) asked if the R. H. S. could obtain books for daughter societies at cheap rates. The Chairman explained that this help was impossible, as the Society had not privileged terms even for its own library, but could only buy in the open market.

The Croydon Horticultural M.I. Society (represented by Mr. Gregory, Mr. Mills, and Mr. Boshier) asked for suggestions to assist them in making their meetings more attractive to young men.

It was stated that past efforts, such as the offer of prizes for essays, had failed. The discussion showed the difficulty to be one generally experienced. Mr. Geo. Gordon, V.M.H., suggested that they would make the meetings more attractive by employing lantern-slides for lectures, that the lecturers should be eminent men, and especially that some definite and practical scientific knowledge should be imparted. He instanced a course of lectures at which an average of eight only were present, but upon a change of the subject to one of a scientific nature the average increased to eighty. A further suggestion was to give young men minor posts in the Society, as reporters and assistant librarians, &c., and so encourage their interest. The Chairman said that perhaps the truest key to the question was personal effort on the part of the Societies' committees, and of the neighbouring head gardeners. If the meetings were made worth while for a young man to spend his time at them, a word of special invitation would unfailingly answer.

The Croydon Society also introduced the subject of horticultural education of the elder school-children and of those who had recently left school. The Highgate delegates stated that their Society provided classes for juveniles and distributed plants to them for raising and exhibition. Last year out of 700 plants given away, 500 were subsequently shown. Preston also undertakes a similar distribution, circulating 2,000 plants annually; and likewise Egham, where 4,000 pots of cuttings and 1,000 packets of seeds were distributed last year, of which 3,000 appeared at the Show. Again, at Preston gardening lectures are given by the Society at the various schools, with the sanction and approval of the educational authority, and the Public Parks Committee provide the soil, pots, and plants for the distribution—as a result of the Society's application. This Society also sets apart special hours for the scholars' attendance, thus enabling no less than 9,000 of them to pay a visit last year to the Show.

GENERAL MEETING.

October 26, 1909.

Sir Albert Rollit, D.L., in the Chair.

Fellows elected (31).—A. H. Abraham, A. Bilbrough, Hon. Mrs. Brand, Miss M. Callaghan, A. H. Dence, E. E. Fenwick, Mrs. T. B. Franklin, R. Heinekey, Wilfrid G. Hoare, W. H. Jenkins, F. W. Jones, Miss H. C. Jones, A. E. Leatham, Assheton Leaver, Miss G. A. Looker, Mrs. F. Mackinnon, A. Pardy, Mrs. C. Parker, Mrs. A. Ricardo, R. Ritchie, Mrs. H. S. Rogers, Mrs. A. Ryley, Mrs. Salisbury, Mrs. G. Shelley, J. A. Stoneham, Capt. H. V. Wingfield Stratford, Mrs. Vaughan-Johnson, Miss Vernham, H. Whistler, Mrs. W. Wilson, Junr., G. E. Wyatt.

Fellow resident abroad (1).—W. Patterson (India).

Associates (4).—H. C. Arnold, Miss S. Bond, Miss I. Frost, Miss E. Watts.

A lecture on "Remarkable Instances of Plant Dispersion" was given by the Rev. Prof. G. Henslow, M.A., V.M.H. (see p. 342).

GENERAL MEETING.

November 9, 1909.

Mr. George Bunyard, V.M.H., in the Chair.

Fellows elected (19).—Rev. H. S. Arkwright, Mrs. Bethell, Mrs. A. Cave, A. L. Dickins, W. F. Giles, Miss B. A. Gray, R. Kaye Gray, Hon. Wm. Hall-Jones, Mrs. Hogarth, L. H. Luddington, H. Patience, H. Philipson, A. E. Pickford, Mrs. Colquhoun Reade, Miss A. Scrivens, R. E. Seyd, F. Silva, T. Skinner, Miss A. Wauchope.

Fellow resident abroad (1).—P. A. Smith (U.S.A.).

Associates (2).—Miss H. Rolleston, Miss E. Smith.

Society affiliated (1).—Hawke's Bay Agricultural Society.

A lecture on "Some Beautiful Shrubs" was given by Mr. Edwin Beckett, V.M.H. (see p. 352).

GENERAL MEETING.

November 23, 1909.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H. (President of the Society), in the Chair.

Fellows elected (48).—Mrs. R. Adamson, C. M. Agnew, E. C. Arnold, Rev. A. Bridge, C. Butler, T. L. Butler, Mrs. M. E. Christie-Miller, E. W. Clayforth, M.A., Mrs. Clayton, Mrs. Boyce Combe, Mrs. Connell, Mrs. A. Forbes, Mrs. T. Wharton Ford, Lady Foster, Miss Fullarton, Miss E. W. Greer, Mrs. J. H. Gurney, Miss B. M. Helme, Miss F. M. Hill, Miss H. Hunt Holley, Mrs. L. Hudson, Watkin F. Hurndall, W. N. Hutchings, J.P., Miss S. R. Hyam, E. Stopford Jones, George Jones, W. Kettlewell, Lady Lucas-Tooth, Hon. Mrs. R. Lygon, T. Duncombe Mann, Miss B. Mildmay, Bertram Noakes, W. W. Parkinson, Mrs. B. Partridge, Dr. F. S. Pearson, Lady Edith Playfair, W. Povey, W. T. Price, Miss M. Robbins, Mrs. Rough, Mrs. Roxburgh, Mrs. Sadler, T. Schleicher, Lady Scott-Moncrieff, Mrs. Simpson, W. Stanley Smith, Mrs. P. Thornton, Miss Warmington.

Fellows resident abroad (2).—T. L. Clarke (Canada), C. Ellison-James (India).

A lecture on "Spices" was given by Mr. J. A. Alexander (see p. 366).

EXHIBITION OF COLONIAL-GROWN FRUITS, AND OF BRITISH BOTTLED FRUITS.

December 1–4, 1909.

The Thirteenth Annual Exhibition of Colonial-grown Fruits and Vegetables, held under the auspices of the Society, was opened by Her Royal Highness the Princess Louise, Duchess of Argyll, accompanied by His

Grace the Duke of Argyll, K.T., G.C.M.G., G.C.V.O., at the Society's Hall on December 1. An Exhibition of British Bottled Fruits was held in conjunction with it. Five hundred cases of Apples staged by the Government of British Columbia made a most impressive exhibit. The President and Council wish to record their appreciation of the development of these Colonial Shows, and the interest they are awakening amongst the Fellows and the public. It is no small pleasure to be of assistance to our over-sea brethren by means of these shows once a year, and the number of Colonial visitors is a sufficient indication of the watchful interest taken in the Society and its efforts on their behalf. The President and Council sincerely thank Her Royal Highness, and His Grace the Duke, for their helpful presence at the opening of the Show and for the great interest they evinced.

The Opening Ceremony was as follows :—

Her Royal Highness was received at the entrance by Sir Trevor Lawrence, Bart., K.C.V.O., the President of the Society, accompanied by the following Agents-General, Colonial representatives, and others :

Lord Strathcona, K.C.M.G., T. H. Middleton, Esq. (Assistant Secretary Board of Agriculture), Sir John Taverner, Agent-General for Victoria, Sir Neville Lubbock, K.C.M.G., President of the West India Committee, the Hon. J. H. Turner, Agent-General for British Columbia, W. M. Graham Easton, Esq., Secretary for New Brunswick, and His Worship the Mayor of Westminster (the Rev. F. Harcourt Hillersdon, M.A., J.P.).

These were joined on the platform by Lady Lawrence, Miss Lawrence, Lady Lubbock, Lady Taverner, Mrs. J. H. Turner, C. Alexander Harris, Esq., C.B., C.M.G. (Colonial Office), J. A. Turner, Esq. (Secretary to the Agent-General for British Columbia), Mrs. J. A. Turner, W. E. Scott, Esq., British Columbia, Deputy Minister of Agriculture, R. Rutherford, Esq. (Vice-Chairman of the West India Committee), A. E. Aspinall, Esq. (Secretary to the West India Committee), Mrs. A. E. Aspinall, A. Bowder, Esq. (of New Brunswick) ; Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Sir Daniel Morris, K.C.M.G., Sir Albert Rollit, D.L., D.C.L., LL.D. (Members of the R.H.S. Council), and Rev. W. Wilks, Secretary R.H.S.

On arriving at the platform Sir TREVOR LAWRENCE said : May it please your Royal Highness, My Lords, Ladies and Gentlemen,—I will only trouble you with a very few remarks. In the first place, on behalf of the Royal Horticultural Society, allow me to thank Her Royal Highness and His Grace the Duke of Argyll for their presence here to-day.

I am glad to say that we are able to show a very varied and comprehensive display of Colonial Fruit. This is the thirteenth of these Exhibitions which we have held in this Hall ; and it is in quality as well as in quantity decidedly superior to any of its predecessors, good as they also have been.

The principal Colonies represented are : The West Indies, British Columbia, New Brunswick (for the first time), New Zealand, Victoria, and South Africa ; and the Province of Manitoba, in which Lord Strathcona takes especial interest, has for the first time a fine display of fruit. The West Indies, I am sorry to say, are not so well represented as they would have been, on account of the very serious storms and climatic troubles with which many of the Islands have recently been beset.

I think it must be a very considerable advantage to the Colonies that the friendly rivalry which is established here should continue. They perceive what their neighbours are doing; and we perceive what they are doing. And altogether the standard of quality which fruit can possess is growing gradually higher and higher. We in this country I believe, are not altogether without ground of complaint about our climate. This year beyond all recent years the climatic conditions have been most trying to the ripening of outdoor fruits. Of course we know that the climate of North America, although severe on the whole in winter, lends itself admirably, on account of its brilliant and protracted fine-weather summers, to the growth of fruit. The method of collecting, grading, and picking fruit has been brought so much towards perfection that the fruit arrives here as fresh as on the day when it left the orchard where it was grown.

The feeling that we have in the Royal Horticultural Society is that whatever we can do—and after all it depends largely upon the efforts of the Colonies themselves—to promote the advance of cultivation and the methods of treatment in the Colonies is a work of love with us. We have done all we can and we shall continue to do all we can. I am quite certain that the feeling of love for our Colonies, which dwells I believe in the hearts of all Englishmen, will, so far as the Society is concerned, find an ample echo in the Colonies. We know how much we owe to the Colonies; and we shall be anxious, as far as our Society is concerned, to do what little we can to repay them. With your permission, I will now ask Her Royal Highness to honour us by declaring the show open.

Her Royal Highness then declared the show open.

The Duke of Argyll said: Ladies and Gentlemen,—Her Royal Highness and I are much obliged to you for giving us an opportunity of seeing the show before speaking of it on this platform. We shall all be agreed, I am sure, that it is a great thing to have ample space for so many exhibits. The last time we went to a show of Colonial Fruit it was held at the Imperial Institute, where the space is hardly large enough and the exhibits were necessarily rather crowded. Thanks to your Society, there is here ample scope to see all the various exhibits at one's ease; and those who are in attendance upon them are able to explain all about them. Whether they come from the old country, or from the other end of the world—whether from Tiptree or Taranaki, they are equally useful and good.

With regard to our Colonies in the Southern Hemisphere, of course cold storage makes the transit of fruit a comparatively easy matter. I was told by a friend yesterday, who was enthusiastic about Colonial fruit, that one of the shippers had said to him: "If you will pay me 12*s*. 6*d*. or 13*s*. a week, I will provide as much fruit as you can possibly want to entertain your friends every week." So the old country must look to its laurels.

I am sure none of us regret the rivalry of our Colonies; the more they can send us in the way of food the better for both; and that is what we want to convince people of here, that the Colonies have plenty of food to send us and are wanting to send it.

With regard to the Northern Colonies, we see even in Manitoba, hitherto supposed to be unfavourable for apple-growing, what excellent fruit has been raised. So that we can look to having apples from the centre of Canada as well as from the Atlantic and Pacific provinces. With regard to the latter I am told that one lady, Widow Smith, gains an income of two thousand a year from her apple orchards in British Columbia. Certainly, with regard to what is called the "Dry Belt," they have most marvellous crops of apples and astonishingly good.

I think all the Colonial Governments should thank the Royal Horticultural Society, as we do, for having lent this magnificent Hall and given us so very fine a show.

The Secretary of the Society, in handing a beautiful box of crystallized fruits to the Princess, said: The warm personal interest which Her Royal Highness has always taken in the revival of old British industries and in the establishment of new ones is known throughout the length and breadth of the land. When therefore it came to our knowledge that the first specimens of British-made crystallized fruits were to be exhibited to-day by Messrs. Wilkin, of Tiptree, it seemed only fitting that the very first box should be offered to the Princess, who has most kindly consented to accept it.

Sir Trevor Lawrence: It only remains for me to ask you all to join with us in expressing our cordial thanks to the Princess and the Duke for their presence with us this morning.

JUDGES OF COLONIAL FRUIT.

Bunyard, Geo., V.M.H.
Butt, Geo. F.
Fielder, C. R.
Garcia, M. J.
Hudson, J., V.M.H.
Monro, G.
Walker, A. M.
Pearson, A. H.
Smith, F.

JUDGES OF COLONIAL PRESERVES.

Marshall, W., V.M.H.
Wilkin, A. C.

JUDGES OF HOME-BOTTLED FRUITS AND JAMS.

Bowles, E. A., M.A.
Lehmann, G.
Marshall, W., V.M.H.
Mitchell, D.
Senn, C. Hermann.
Wilkin, A. C.

Colonial Fruit and Preserves.

Gold Medal.

The Permanent Exhibition Committee of Trinidad (Honorary Representative, Mr. A. E. Aspinall), for Fruits and Preserves.

The Government of the Province of British Columbia (Agent-General, Hon. J. H. Turner, Salisbury House, E.C.), for Apples.

The West Indian Produce Association, for Fruits, Vegetables, Preserves, etc.

Silver-gilt Knightian Medal.

The Permanent Exhibition Committee of Dominica (Honorary Representative, Mr. A. E. Aspinall), for Fruits and Vegetables.

The Government of the Province of New Brunswick (Secretary, Mr. W. M. Graham Easton; Representative, Mr. A. Bowder), for Apples.

Dominica Botanic Station, for Citrus Fruits.

Okanagan Fruit Union, Vernon, B.C., for Apples.

Messrs. B. Shearn, Tottenham Court Road, for Nuts.

The Jamaica Agency, Holborn, for Fruits and Vegetables.

Silver-gilt Banksian Medal.

Mrs. John Smith, Spences Bridge, British Columbia, for Apples.

Kaslo District Fruit Growers' Association, B.C., for Apples.

Stirling & Pitcairn, Kelowna, British Columbia, for Apples.

Jamaica Agency, Holborn, for Jams.

Silver Knightian Medal.

The Permanent Exhibition Committee of Montserrat (Honorary Representative, Mr. A. E. Aspinall), for Preserves.

Hon. J. Cox Fillan, Dominica, for Limes.

Victoria District, Vancouver Island, British Columbia, for Apples.

Salt Spring Island, nr. Victoria, British Columbia, for Apples.

Mr. C. T. Cooney, Kamloops, British Columbia, for Apples.

The Dominion of New Zealand (High Commissioner, Hon. W. Hall Jones), for a collection of cold-storage Fruits, Honeys, &c.

Mrs. T. Van De Bosch, Riverside, O.R.C., for Dried Fruits.

The Government of Victoria (Agent-General, Sir John Taverner), for Dried Fruits.

Silver Banksian Medal.

Mr. F A. Hubbard, Burton, New Brunswick, for Apples.

Mr. C. W. Peters, Queenstown, New Brunswick, for Apples.

Mr. J. P. Belyea, Lower Gagetown, New Brunswick, for Apples.

Mr. J. G. de Gannes, Trinidad, for Oranges.

Messrs. Gordon Grant, Trinidad, for Limes.

Mr. J. G. Haines, Trinidad, for Coco-nuts.

Messrs. Gordon Grant, Trinidad, for Coco-nuts.

The Government of Victoria (Agent-General, Sir John Taverner) for Preserved Fruits.

Messrs. Westmacott, Leadenhall Street, E.C., for Cape Wines and Preserves.

Roseau Valley Fruit Co., 46 Swan Street, E.C., for Fruits.

Mr. W. Pattinson, Anerley, for Banana specialities.

Army and Navy Auxiliary C.S., for Fruits and Vegetables.

Roseau Valley Fruit Co., 46 Swan Street, E.C., for Bottled Fruits.

The Government of Victoria (Agent-General, Sir John Taverner), for Bottled Fruits.

Bronze Banksian Medal.

Dr. Hon. H. A. A. Nichols, C.M.G., Dominica, for Oranges.

Everton Estate, Dominica, for Oranges.

Corona Estate, Dominica, for Oranges.

Carholme Estate, Dominica, for Limes.
Mr. J. J. Brown, Trinidad, for Coco-nuts.

English-grown Fruit.

Silver-gilt Hogg Medal.

Messrs. James Veitch, Chelsea, for Apples.
Messrs. Bunyard, Maidstone, for Apples.

Silver Banksian Medal.

Messrs. Ambrose Palmer, Grosvenor Road, for Fruit.

Home Bottled and Preserved Fruits.

Division "A."—Fruits Bottled in Pure Water.

Class **1.**—Home Bottled British-grown Fruits. Open.
1. *Gold Medal.*
W. Poupart, Twickenham.
2. *Silver-gilt Banksian Medal.*
Swanley Horticultural College.

Class **2.**—24 Bottles of British-grown Fruits (including 12 different kinds at least). Amateurs.
1. A "Mercia" Sterilizer presented by Miss Bradley.—Mrs. Banks, 102 Park Street, W.
2. £2.—Mrs. E. Beckett, Elstree.

Class **3.**—18 Bottles of British-grown Fruits (including 9 different kinds at least). Amateurs.
1. £2 10*s.*—Not awarded.
2. £1 10*s.*—B. C. Dyson, Bramley.

Class **4.**—12 Bottles of British-grown Fruits (including 6 different kinds at least). Amateurs.
1. £2.—Mr. H. Tobutt, Wallington.
2. £1.—Mrs. M. Parlour, Darlington.

Class **5.**—6 Bottles of British-grown Fruits (including 4 different kinds at least). Amateurs.
1. £1.—Mrs. Hartshorn, 37A Brook Street, W.
2. 15*s.*—Mrs. W. H. Plowman, Westminster.

Division "B."—Fruits Bottled in Syrup.

Class **1a.**—Home Bottled British-grown Fruits. Open.
1. W. Poupart. (Award included in Gold Medal. See Division "A," Class 1.)

Class **2a.**—24 bottles of British-grown Fruits (including twelve different kinds at least). Amateurs.
1. A "Mercia" Sterilizer, presented by Miss Bradley.—Mrs. Banks, 102 Park Street, W.
2. £2.—G. P. O. North, Refreshment Club.

Class **3a.**—18 bottles of British-grown Fruits (including nine different kinds at least). Amateurs.
1. £2. 10*s.*—Miss E. G. Cook, Ashford.
2. £1. 10*s.*—Viscountess Galway, Bawtry.

Class **4a.**—12 bottles of British-grown Fruits (including six different kinds at least). Amateurs.
1. £2.—Miss F. L. Pike, Serge Hill.
2. £1.—Not awarded.

Class **5a.**—6 bottles of British-grown Fruits (including four different kinds at least). Amateurs.
1. £1.—Not awarded.
2. 15*s.*—Mrs. W. H. Plowman, Westminster.
Extra. 10*s.*—Miss May Parlour, Croft, Darlington.

Division "C."—Vegetables.

Class **6.**—Home-Preserved Vegetables (either bottled or dried). Open.
No Award.

Class **7.**—Home-Bottled Vegetables. 8 bottles (including four different kinds at least). Amateurs.
1. £1. 10*s.*—Mrs. E. Beckett, Aldenham.
2. 15*s.*—Mrs. Banks, 102 Park Street, W.

Class **8.**—Home-Tinned Vegetables. (3 tins of a kind, one to be opened at the Judges' discretion.) Open.
No entry.

Division "D."—Jams, Jellies, &c.

Class **9.**—Jams in Clear Glass Jars or Bottles. (Jellies excluded.) Made of British-grown fruits only (including 9 different kinds at least). Open.
1. *Silver-Gilt Banksian Medal.*
Messrs. Miles, Hove.

Class **10.**—18 One Pound Clear Glass Jars or Bottles of Jam. (Jellies excluded). Made of British-grown Fruits only (including 9 different kinds at least). Amateurs.
1. £2 10*s.*—Miss E. G. Badcock, St. George's Square, S.W.
2. { £1 10*s.*—Mrs. E. Beckett, Aldenham Park.
{ £1 10*s.*—Miss Gordon Thompson, Potter's Bar.

Class **11.**—Fruit Jellies and Fruit Cheese in Clear Glass Jars or Bottles (including 6 different kinds at least). Open.
1. *Silver Knightian Medal.*
Swanley Horticultural College.
2. *Silver Banksian Medal.*
Miss Elsie G. Cook, Ashford Farm.

Class **12.**—12 One Pound Clear Glass Jars or Bottles of Fruit Jellies and Fruit Cheese (including 6 kinds at least). Amateurs.

1. £2.—Mrs. Banks, 102 Park Street, W.
2. £1.—Miss Gordon Thompson, Potter's Bar.

Class **13.**—Home Dried, or Evaporated Fruits. Open.

No entry.

Class **14.**—Miscellaneous Collection of Home Bottled Produce, Pickles, Sauces, &c. Amateurs.

Silver-gilt Knightian Medal.

Mrs. Banks, 102 Park Street, W.

Class **15.**—Miscellaneous. (For Preserving Appliances, &c.) Open.

W. Poupart. (Award included in Gold Medal. See Division "A" —Class 1.)

Silver Knightian Medal.

Messrs. Fowler Lee, Reading.

French Flint Glass Bottle Co., 6 and 7 Long Lane, E.C.

Silver Banksian Medal.

G. O. Henninger, Great Tower Street, E.C.

Bronze Banksian Medal.

Abbot Brothers, Southall.

Class **16.**—Non-Competitive Exhibits.

Silver-gilt Knightian Medal.

Messrs. Wilkin, Tiptree, for Bottled Fruits, Jams and Crystallized Fruits.

Silver Knightian Medal.

Messrs. Politi, Highbury, for Jams, &c.

Elsenham Jam Co., Stanstead, for Jams and Distilled Lavender.

Silver Banksian Medal.

Mrs. S. Miller, Marlow, for Bottled Fruits, Chutneys, &c.

Miss Martin, New York, for Bottled Fruits.

Middlesex Jam Co., Brentford, for Jams.

Class **29.**—(From 1908 Schedule.) 3 bottles of British-grown Fruits (of which one must be Raspberries), bottled and shown by Exhibitors who do not sell their produce or in any way work for the trade, wholesale or retail, but only and entirely for their own household consumption. To be shown November 26, 1908, and left in the Society's care until a corresponding date in 1909, when they will be tested and the prizes awarded.

1. Silver Cup.—Miss Sparrow, Shenley, Herts.
2. £1 10*s*.—Miss M. Yeatts, Inchicronan, Frinton-on-Sea.

Extra £1.—Miss J. B. Shackle, Dropmore Vicarage, Maidenhead.

GENERAL MEETING.

December 7, 1909.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H. (President of the Society), in the Chair.

Fellows elected (25).—S. Bird, Mrs. G. Cave, R. Clarke, M. Cockburn, W. F. Colclough, M.D., C. T. Cox, W. K. Crooke, Lt.-Col. H. M. Dale, R. d'Eyncourt Day, E. W. Elliott, Miss A. E. Gamlen, Miss Godwin, A. Leveson-Gower, Mrs. G. Heathcote, H. S. Holt, Lt.-Col. E. Hudson, F.R.C.S., Rev. W. E. Jackson, Mrs. H. W. Lyle, Miss E. L. Morris, Mrs. Byron-Peters, Mrs. F. Powers, W. B. Randall, Mrs. T. Tomlinson, J. Villiers, Mrs. S. E. Williams.

Fellows resident abroad (2). R. C. Bysack (India), F. G. Millar (India).

GENERAL MEETING.

December 21, 1909.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., (President of the Society), in the Chair.

Fellows elected (44).—J. D. Adair, E. Besant, Mrs. Blair, W. P. Bound, E. C. Broquet, Mrs. E. C. Broquet, R. H. Burbridge, Mrs. Bushell, J. E. Cherry, A. J. Cobb, H. Cooke, T. Coulthwaite, J. J. Crosfield, Miss Curling, E. S. Currey, Mrs. d'Engelbronner, Guy Ellis, G. B. Francis, H. Gatliff, Miss Hadden, G. Haynes, T. H. W. Idris, Capt. C. E. Johnston, Mrs. Keir, Mrs. Livingstone-Learmouth, Mrs. E. H. Lee, Mrs. C. H. Leonard, Miss Levick, Mrs. E. H. Platt, E. Preedy, C. W. Richardson, E. R. Ridgers, J. E. Savage, F. T. Simpson, A. H. Smith, Mrs. T. F. Stillwell, Lady Thomas, Lieut.-Col. R. C. Wellesley, E. H. Wells, Alan W. White, T. Wild, Hon. Frances Wolseley, G. S. Woodcock, W. Austin Wright.

Fellows resident abroad (5).—Baron Sir Theodor Adelswart (Sweden), Miss M. C. Coffin (New York), A. B. Cutting (Ontario), Carl G. Dahl (Sweden), Count Sándor Teleki (Hungary).

Society Affiliated (1).—St. Martin's (G.P.O.) Horticultural Society.

SPECIAL CLASSES AT THE EXHIBITIONS IN 1909.

[THE FRUIT AND VEGETABLE COMPETITIONS ARE HELD IN PLACE OF THE GREAT AUTUMN SHOW.]

TUESDAY, SEPTEMBER 14.

Class **3.**—Early Pears, 4 dishes, distinct. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. Sir Mark W. Collet, Bart., Kemsing, Sevenoaks, Kent (gr., M. Nicholls).
2. M. W. Price, Esq., The Node, Welwyn, Herts (gr., T. Pateman).

Class **4.**—Early Pears, 2 dishes, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. E. S. Hanbury, Esq., Poles Park, Ware, Herts (gr., F. W. Church).
2. W. A. Voss, Esq., Eastwood Road, Raleigh, Essex.

Class **5.**—Early Apples, 4 dishes dessert, distinct. Amateurs.
First Prize, £1; Second, 15*s.*

1. M. W. Price, Esq.
2. E. S. Hanbury, Esq.

Class **6.**—Early Apples, 2 dishes dessert, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. Sir Mark W. Collet, Bart.
2. Viscount Enfield, Wrotham Park, Barnet (gr., H. Markham).

Class **7.**—Cooking Apples, 6 dishes, distinct. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. Sir Marcus Samuel, Bart., The Mote, Maidstone, Kent (gr., W. H. Bacon).

Class **8.**—Cooking Apples, 3 dishes, distinct. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

1. Viscount Enfield.
2. E. S. Hanbury, Esq.

Class **9.**—Early Apples and Pears, collection in a space of 9ft. × 3ft. Trade Growers.
First Prize, Silver-gilt Banksian Medal; Second, Silver Knightian Medal.

1. Messrs. W. Seabrook, The Nurseries, Chelmsford.

Class **10.**—Plums and Damsons, collection in a space 9ft. × 3ft. Trade Growers.
First Prize, Silver-gilt Banksian Medal; Second, Silver Knightian Medal.

No entries.

Tuesday, September 28.

Class **3.**—Peas, 3 dishes, distinct. Amateurs.

First Prize, 15*s.*; Second, 10*s.*

1. Hon. Vicary Gibbs, Aldenham House, Elstree, Herts (gr., E. Beckett).
2. Countess Cowper, Panshanger, Hertford (gr., R. Staward).

Class **4.**—Peas, 1 dish. Amateurs.

First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. C. Watney, Esq., Garston Manor, Watford (gr., G. Dyke).
2. Rev. L. C. Chalmers-Hunt, Willian Rectory, Hitchin.

Class **5.**—Vegetables, collection of 9 kinds. Amateurs.

First Prize, £3; Second, £2.

1. Hon. Vicary Gibbs.
2. H. T. Tatham, Esq., Kendall Hall, Elstree, Herts (gr., W. Gaiger).

Class **6.**—Vegetables, collection of 6 kinds. Amateurs.

First Prize, £2; Second, £1 10*s.*

1. Rev. A. Turner, Woburn Park, Weybridge, Surrey (gr., A. Basile).
2. Mr. G. Hobday, Havering Road, Romford.

Class **7.**—Vegetables, collection of 12 kinds. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **8.**—Salads, collection in a space 4ft. × 3ft. Amateurs.

First Prize, £2; Second, £1 10*s.*

1. Hon. Vicary Gibbs.
2. Countess Cowper.

Class **9.**—Salads, collection in a space 6ft. × 3ft. Trade Growers.

First Prize, Silver Banksian Medal; Second, Bronze Knightian Medal.

No entries.

Class **10.**—A collection of Autumn Strawberries. Amateurs.

First Prize, £1 10*s.*; Second, £1.

No entries.

Tuesday, October 12.

Class **3.**—Affiliated Societies' Competition. Six dishes, distinct, cooking Apples; 6 dishes, distinct, dessert Apples; 6 dishes, distinct, dessert Pears.

It is stipulated that no two Societies may combine, and that each Society competing collect all the specimens shown from amongst their own members only and not from outside. Eight days' notice must be given.

First Prize, Challenge Cup to be held for twelve months, and Silver-gilt Knightian Medal; and a set of their Publications, with Charts and Handbook, presented by the Worshipful Company of Fruiterers.

Second, Silver-gilt Banksian Medal ; Third, Silver Banksian Medal.

1. Royal Jersey Agric. & Hort. Society; Sec., P. Aubin, Hort. Dept. Jersey.
2. East Anglian Horticultural Club; Sec., W. L. Wallis, 12 Royal Arcade, Norwich.
3. Ipswich & Dist. Gardeners' & Amateurs' Assoc.; Sec., F. W. Salmon, 65 Brook Hall Road, Ipswich.

Class **4.**—Grapes, 3 varieties, ripe, 3 bunches of each. Amateurs
First Prize, £4, and a Silver-gilt Knightian Medal.
Second, £3, and a Silver Knightian Medal.

1. W. G. Raphael, Esq., Castle Hill, Englefield Green (gr., H. H. Brown).
2. T. Miller, Esq., Newberries, Radlett, Herts (gr., J. Kidd).

Class **5.**—Three bunches of 1 ripe Black Grape, for flavour. Amateurs.
First Prize, £1 10*s.* ; Second, £1.

1. Dowager Lady Hillingdon, Wildernesse, Sevenoaks (gr., J. Shelton).
2. M. W. Price, Esq.

Class **6.**—Three bunches of 1 ripe White Grape, for flavour, excluding Muscat of Alexandria. See 1909 Rules for Judging, § 64. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. A. Benson, Esq., Upper Gatton Park, Merstham, Surrey (gr., H. Cornish).

Class **7.**—Three Bunches Muscat of Alexandria, ripe. Amateurs.
First Prize, £1 10*s.*; Second, £1.

1. A. Benson, Esq.
2. Earl of Harrington, Elvaston Castle, Derby (gr., J. H. Goodacre).

Class **8.**—Grapes, 4 varieties, ripe, 3 bunches of each. Trade Growers.
First Prize, Silver-gilt Knightian Medal ; Second, Silver-gilt Banksian Medal.

No entries.

Class **9.**—Plums, 3 dishes, dessert, distinct. Amateurs.
First Prize, 15*s.* ; Second, 10*s.*

1. J. T. Charlesworth, Esq., Nutfield Court, Redhill, Surrey (gr., T. W. Herbert).
2. Lord Howard de Walden, Audley End, Saffron Walden (gr., J. Vert).

Class **10.**—Plums, 3 dishes, cooking, distinct. Amateurs.
First Prize, 15*s.* ; Second, 10*s.*

1. Lord Howard de Walden.
2. J. T. Charlesworth, Esq.

Class **11.**—Plums, 9 dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal ; Second, Silver Banksian Medal.
No entries.

Class **12.**—Raspberries, 2 varieties, 6 bearing canes of each. Amateurs.
First Prize, 15*s.*; Second, 10*s.*

No entries.

Class **13.**—One dish of 1 variety. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Not awarded.
2. C. Watney, Esq.

Class **14.**—Collection of Raspberries, Strawberries, Damsons, and Bullaces. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY, OCTOBER 26.

Class **3.**—Apples introduced to commerce since 1892, 6 dishes, distinct. Amateurs.
First Prize, £2; Second, £1 10*s.*; Third, £1.

1. J. G. Williams, Esq., Pendley Manor, Tring, Herts (gr., F. G. Gerrish).
2. Sir Marcus Samuel, Bart.
3. H. Whiteley, Esq., 18 Endsleigh Place, Marychurch, Torquay.

Class **4.**—Apples as above, 3 dishes, distinct. Amateurs.
First Prize, £1; Second, 15*s.*

1. Not awarded.
2. Lord Clinton, Bicton, East Budleigh, Devon (gr., J. Mayne).

Class **5.**—Apples as above, a dish of 1 dessert variety. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Sir Marcus Samuel, Bart.
2. Earl Beauchamp, Madresfield Court, Malvern (gr., W. Crump).

Class **6.**—Apples as above, a dish of 1 cooking variety. Amateurs.
First Prize, 7*s.* 6*d.*; Second, 5*s.*

1. Earl Beauchamp.
2. Lord Clinton.

Class **7.**—Apples as above, twelve dishes, distinct. Trade Growers.
First Prize, Silver-gilt Knightian Medal; Second, Silver-gilt Banksian Medal.

No entries.

Class **8.**—Apples as above, six dishes, distinct. Trade Growers.
First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **9.**—Apples as above, three dishes, distinct. Trade Growers.
First Prize, Silver Banksian Medal; Second, Bronze Knightian Medal.

No entries.

Class **10.**—Apples as above, a dish of 1 dessert variety. Trade Growers.

First Prize, Silver Banksian Medal.

No entries.

Class **11.**—Apples as above, a dish of 1 cooking variety. Trade Growers.

First Prize, Silver Banksian Medal.

No entries.

Class **12.**—Pears introduced to commerce since 1892, 3 dishes, distinct. Amateurs.

First Prize, £1; Second, 15*s*.

1. Lord Hillingdon, Hillingdon Court, Uxbridge (gr., A. R. Allan).
2. Sir Marcus Samuel, Bart.

Class **13.**—Pears as above, a dish of 1 dessert variety. Amateurs.

First Prize, 7*s*. 6*d*.; Second, 5*s*.

1. Sir Marcus Samuel, Bart.
2. J. G. Williams, Esq.

Class **14.**—Pears as above, 4 dishes dessert, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **15.**—Pears as above, a dish of 1 dessert variety. Trade Growers.

First Prize, Silver Banksian Medal.

No entries.

TUESDAY, NOVEMBER 9.

Class **3.**—Potatos, 12 dishes, distinct. Amateurs.

First Prize, £2; Second, £1 10*s*.

1. The Duke of Portland, Welbeck Abbey, Worksop, Notts (gr., J. Gibson).
2. Countess Cowper.

Class **4.**—Potatos, 6 dishes, distinct. Amateurs.

First Prize, £1 10*s*.; Second, £1.

1. Mrs. Denison, Little Gaddesden, Berkhamsted (gr., A. G. Gentle).

Class **5.**—Potatos, 18 dishes, distinct. Trade Growers.

First Prize, Silver-gilt Knightian Medal; Second, Silver-gilt Banksian Medal.

1. Messrs. James Carter, High Holborn, W.C.

Class **6.**—Potatos, 12 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries

Class **7.**—Onions, 6 dishes, distinct. Amateurs.

First Prize, £1 10*s.*; Second, £1.

1. Hon. Vicary Gibbs.
2. A. B. H. Goldschmidt, Esq., Cavenham Park, Mildenhall, Suffolk (gr., G. Hatch).

Class **8.**—Onions, 9 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY, NOVEMBER 23.

Class **3.**—Apples, 3 dishes of dessert and 6 of cooking, distinct. Amateurs.

First Prize, £2 and Medal of the Worshipful Company of Fruiterers; Second, £1 10*s.*; Third, £1; Fourth, 15*s.*

1. J. G. Williams, Esq.
2. Sir Marcus Samuel, Bart.
3. C. H. Combe, Esq., Cobham Park, Cobham, Surrey (gr., A. Tidy).
4. M. W. Price, Esq.

Class **4.**—Apples, 2 dishes of dessert and 4 of cooking, distinct. Amateurs.

First Prize, £1 10*s.*; Second, £1; Third, 15*s.*

1. Not awarded.
2. J. T. Charlesworth, Esq.
3. Col. The Hon. C. Harbord, Gunton Park, Norwich (gr., W. Allan).

Class **5.**—Apples, 4 dishes of dessert and 8 of cooking, distinct. Trade Growers.

First Prize, Silver-gilt Knightian Medal; Second, Silver-gilt Banksian Medal.

1. Messrs. W. Seabrook, The Nurseries, Chelmsford.
2. Messrs. Ambrose Palmer, Upper Halliford.

Class **6.**—Apples, 3 dishes of dessert and 6 of cooking, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **7.**—Pears, 7 dishes of dessert and 2 of cooking, distinct. Amateurs.

First Prize, £2 and Medal of the Worshipful Company of Fruiterers; Second, £1 10*s.*; Third £1.

1. C. H. Combe, Esq.
2. Sir Marcus Samuel, Bart.
3. J. B. Fortescue, Esq., Dropmore, Maidenhead, Bucks (gr., C. Page).

Class **8.**—Pears, five dishes of dessert and 1 of cooking, distinct. Amateurs. First Prize, £1 10*s.*; Second, £1; Third, 15*s.*

1. M. W. Price, Esq.
2. Viscount Enfield.
3. Col. The Hon. C. Harbord.

Class **9.**—Pears, ten dishes of dessert and 2 of cooking, distinct. Trade Growers.

First Prize, Silver-gilt Knightian Medal; Second, Silver-gilt Banksian Medal.

No entries.

Class **10.**—Pears, seven dishes of dessert and 2 of cooking, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

TUESDAY, DECEMBER 7.

Class **3.**—Celery, 2 red varieties. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Hon. Vicary Gibbs.

Class **4.**—Celery, 2 white varieties. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

1. Hon. Vicary Gibbs.

Class **5.**—Celery, 1 red and 1 white. Amateurs.

First Prize, 10*s.*; Second, 7*s.* 6*d.*

No entries.

Class **6.**—Celery, 2 red and 2 white varieties. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **7.**—Beet, 3 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 5*s.*

1. Hon. Vicary Gibbs.
2. Countess Cowper.

Class **8.**—Beet, 3 dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **9.**—Carrots, 3 dishes, distinct. Amateurs.

First Prize, 10*s.*; Second, 5*s.*

1. Hon. Vicary Gibbs.

Class **10.**—Carrots, three dishes, distinct. Trade Growers.

First Prize, Silver Knightian Medal; Second, Silver Banksian Medal.

No entries.

Class **11.**—Brussels Sprouts, 2 varieties, 3 stems of each. Amateurs.
First Prize, 10*s.*; Second, 5*s.*

1. E. J. Preston, Esq., Kelsey Park, Beckenham (gr., M. Webster).
2. Hon. Vicary Gibbs.

Class **12.**—Brussels Sprouts, 2 dishes, distinct, picked. Amateurs.
First Prize, 10*s.*; Second, 5*s.*

1. Hon. Vicary Gibbs.
2. E. J. Preston, Esq.

SCIENTIFIC COMMITTEE.

September 14, 1909.

Mr. A. W. Hill, M.A., F.L.S., in the Chair, and five members present.

Prunus Chapronii.—Mr. Odell submitted the fruit and leaves of a *Prunus* growing in a plantation at Henley. A comparison with the description and plate of the "Revue Horticole," 1881, p. 467, of *Prunus Chapronii*, showed apparent agreement, except that the fruits of the shown were a little smaller. Mr. Hill undertook to see whether he could determine anything further regarding it from the Kew records.

Oenothera sp., &c.—Mr. Fraser, F.L.S., showed a specimen of *Oenothera Lamarckiana* in flower which he had found in his garden, from self-sown seed. He took the form to be that of the primitive species named *Oe. rubrinervis* by De Vries. Last year the veins of the leaves were reddish, whilst this year they were almost white, due possibly to the sunless season. The fruits, however, were streaked with red. Mr. Fraser thought that this variety was taking the place of *Oe. biennis* in Surrey both in the garden and in the wild state.

He also showed a flesh-coloured specimen of *Echium vulgare*, collected in 1901, still retaining the flesh colour, and sprigs of *Calluna vulgaris* var. *glabrescens*, and *Erica cinerea*, gathered in Surrey, growing on a chalk cliff at an elevation of 700 feet. The difficulty of growing heaths and rhododendrons on chalky soils is generally known, and Mr. Fraser was surprised to find the present specimens. The soil was about 18 in. deep, with a further 6 in. of decayed chalk. As 5 in. of soil would be a sufficient depth for the Ericas, it was thought possible that the upper stratum was free from lime, and Dr. Voelcker undertook to analyse a sample if sent to him.

Diseased Pears.—Mr. Wigley, Whitehill, Gravesend, sent some Pears attacked by the fungus *Gloeosporium fructigenum.* The trees should be sprayed in winter with copper sulphate solution (1 lb. to 25 gallons of water), and with Bordeaux mixture in summer.

Lettuce dying.—Cos and Cabbage Lettuces, both young and old plants, were received from Mr. Haskins, of Bournemouth, the leaves of which were browned and decayed at the edges. Mr. Gordon, V.M.H., said that he had experienced the same trouble, and he thought it was due merely to the excessively wet season and cold weather, and was not attributable to wrong treatment or disease.

Scientific Committee, September 28, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, and eleven members present.

Prunus sp.—Mr. Hill, M.A., F.L.S., stated that the plant shown at the last meeting under the name of *Prunus Chapronii* proved to be a form of *P. cerasifera.*

Giant Puffball.—From C. C. Paine, Esq., of Haverstock Hill, N.W., came a specimen of the giant Puffball (*Lycoperdon Bovista*), having a circumference of 38½ in.

Museum preparations.—Dr. Voelcker showed a human heart set up as a museum preparation, which without dissection showed the whole of its structure. The liquid in which it was preserved was a mixture of various ethers, &c., and portions were rendered transparent owing to the refractive index of the liquid being the same as that of the material preserved. The discovery of this preservative was due to Dr. Spalterholz, and it promises to be of great use in preparing museum specimens.

Forms of Impatiens Roylei.—Mr. Bowles showed a white-flowered form of *Impatiens Roylei.* It is rather smaller than the type, and has paler, narrower leaves. He also showed a variegated form which had appeared in his garden among seedlings of *I. Roylei* var. *pallidiflora,* ("Botanical Magazine," t. 7647). The seedling had shown the variegation, and it had been maintained throughout the life of the plant.

Linaria maroccana sport.—Mr. Bowles also showed a sport of *Linaria maroccana* with the corolla split to the base and without spurs, which had occurred in his garden. The flowers failed to produce seed, the ovary being absent.

Narcissus Tazetta var.—He also showed leaves of a form of *Narcissus Tazetta*, which had persisted until the present time. They were quite green and healthy-looking, and about 18 in. in length.

Furcate inflorescence in Typha angustifolia.—Mr. R. Hooper Pearson exhibited a specimen of *Typha angustifolia*, received from Lord Avebury, in whose garden at High Elms, in Kent, the plant was growing. The stem showed a slight fasciation, and it bore at the top four inflorescences as shown in fig. 140. Fasciation appears to be very uncommon in the genus. A somewhat similar specimen was shown from Mr. T. Smith, of Newry, in 1901 (see *Journal R.H.S.* xxvi. p. ccxii.).

Solanine in Solanum nigrum.—The following communication was read by Mr. Holmes, F.L.S.: "*Solanum nigrum* is included amongst poisonous plants in works of toxicology, but cases of poisoning by it are rare, and relate chiefly to children; but its active principle, solanine, undoubtedly possesses poisonous properties in large doses. Solanine was originally discovered by Desfosses, of Besançon, in 1821, in the berries of *Solanum nigrum;* and to it and to atropine, possessing mydriatic properties, its physiological effects are believed to be due. Solanine also occurs in young sprouts of the Potato, in Tomatos, and other species of *Solanum*. *S. nigrum* contains about 0·3 per cent. of solanine. Mature healthy Potatos are said to contain none, but Kassner separated 30 to 50 milligrammes from 150 grammes of diseased Potatos. Orfila found that the extract of *Solanum nigrum* had a very feeble effect as a poison, but rabbits are killed by doses of 0·1 grain of solanine per kilogramme of weight of the animal. The symptoms commence in ten minutes, with apathy, low temperature, and slow breathing; convulsions set in before death, and the pupils become dilated. Dogs are not easily affected by it, as it is usually rejected by vomiting. Blyth, in 'Poisons: their Effects and Detection,' p. 398, remarks: 'Poisoning in all recorded cases (*i.e.* in cases of accidental poisoning of human beings) has not been by the pure alkaloid solanine, but by the berries of different species of *Solanum.* The symptoms, in about twenty cases, have varied so greatly that the most opposite phenomena have been described as the effects of poisoning.'

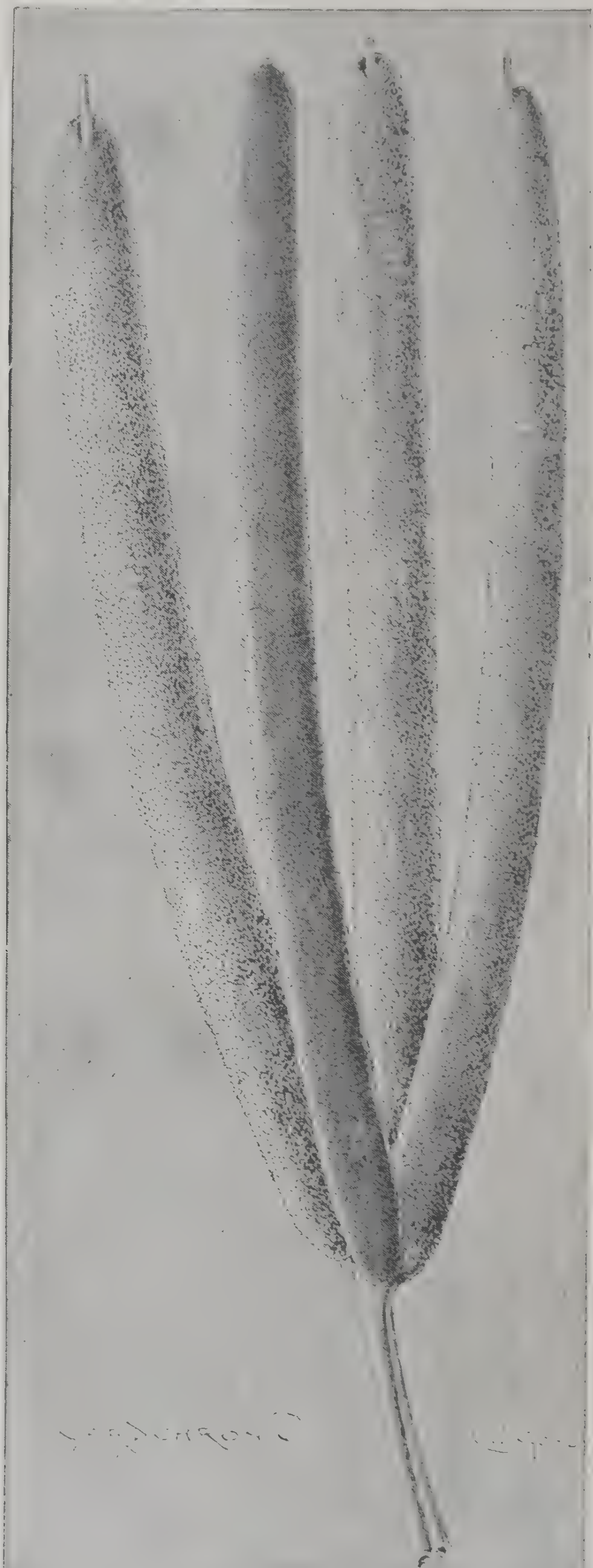


FIG. 140.—BRANCHED SPIKE OF TYPHA ANGUSTIFOLIA.
(p. ccxxiii.)

The recorded cases of poisoning by the berries of *S. nigrum* are not numerous, and have usually occurred in children. The death of three children is recorded by Hirtz, 'Gaz. Méd. de Strasbourg,' in 1812, and other cases by Mauray, 'Gaz. des Hôp,' 1869, J. B. Montaine, 'Chim. Méd.' 1862, and by Ed. Manners, 'Med. Jour.' 1867. The facts concerning cases of poisoning by the berries of *S. nigrum* require confirmation. Even the statement concerning the poisonous action of solanine and its dose need careful revision, for it is highly probable that much of the solanine used by investigators has been impure, and may have contained decomposition products, since solanine is easily split up by various re-agents. Doses of more than quarter-grain, to commence with, would be considered unsafe for medicinal purposes. An excellent summary of what is known of its physiological action will be found in Dupuy, 'Des Alcaloides,' pp. 503–521, and in the 'United States Dispensatory,' 1907 (19th ed.), pp. 1654–5. Reference may also be made to Kobert, 'Lehrbuch der Intoxihationen,' pp. 759 and 1057, regarding the recorded cases of presumed poisoning by solanine in Potatos. With reference to the use of the berries of *Solanum nigrum* as food: first, it is quite possible that in a luxuriant, cultivated form of the plant the amount of solanine might be reduced considerably, and the fruit prove edible. Secondly, the fruit, when boiled, especially in the presence of vegetable acids, might be less likely to produce unpleasant symptoms than the raw fruit, since the decomposition of solanine might take place, and solanidine, which is usually set free, is reported to be non-irritant. Thirdly, the berries have no doubt been largely eaten in the United States, and, so far as I am aware, no dangerous results have followed. Fourthly, some persons are unusually sensitive to the alkaloids of belladonna, and it is quite possible that cases of idiosyncrasy may occur with regard to solanine. That solanine itself can produce distinct physiological action there can be no doubt, but how far the symptoms attributed to it are due to pure solanine has not yet been proved. Fifthly, it is also possible that, as in the Potato, the percentage of solanine present in *Solanum nigrum* may vary according to the age and condition of the fruit, whether ripe or unripe, and to other circumstances of difference in season as regards light and heat. But there is no need apparently to add a fruit of such doubtful utility, and so lacking in good qualities to the list of more palatable fruits already in the market."

Hybrid Willows.—Mr. Fraser, F.L.S., showed six hybrid forms of Willow, recorded in British floras and other botanical works as *Salix ambigua*. Most authorities are agreed that *S. ambigua* is a hybrid between *Salix aurita* and *S. repens*. No two of the forms are exactly alike, but four of them approach *S. aurita* more closely than the other parent. He explained this by the fact that the parents in the wild state are extremely variable, and consequently one might expect the hybrids to be equally variable. Two of the forms approached more nearly to *S. repens* in shape, variation, and character of the hairs. While the leaves of the six forms showed affinity with one or other parent, the catkins were most nearly like those of *S. repens* in size and other particulars. All the above he preferred to name by using the names of the parents, namely, *Salix aurita × repens*. He also showed another hybrid named *Salix cinerea × repens*, with forms of the supposed parents most nearly like them.

Snowdrop with elongated stem.—From Messrs. Barr came a bulb of Snowdrop with the axis of the bulb elongated downwards, forming a cylindrical tapering prolongation about ¾ of an inch long, and showing the anatomical characters of a stem. The form was a double-flowered one of Mr. Allen's raising.

SCIENTIFIC COMMITTEE, OCTOBER 12, 1909.

Mr. E. A. Bowles, M.A., F.L.S., F.E.S., in the Chair, and eight members present.

Fasciation in Tropaeolum.—Mr. Odell showed a specimen of *Tropaeolum tuberosum* with a very broadly fasciated stem. He found that when grown in heavy soil this plant very frequently showed fasciation.

Eucalyptus with intumescence.—Mr. Worsley showed leaves of young plants of *Eucalyptus pulverulenta*, having small wart-like growths upon the surface. This condition somewhat resembles that shown by vines at times, and is due to excess of moisture in the air preventing transpiration.

Datura Stramonium.—Mr. Holmes, F.L.S., showed a plant of the Thorn-apple with slightly pubescent foliage, which had been attacked by aphides in great numbers, so that the fruit had, owing to their presence, assumed a very unusual appearance.

Spirally-twisted Gentian, &c.—Mr. Chittenden showed a spirally-twisted stem of *Gentiana asclepiadea* from Wisley, and bearing the numerous leaves in a loose spiral round the stem. He also showed regular (peloric) flowers from the apex of the stem of *Pentstemon*, similar in character to those often formed in the peloric Foxglove. These flowers usually had two or three ovaries, and twice or thrice the usual number of stamens.

Malformation in Rubus.—Mr. Fraser, F.L.S., referred to a specimen of *Rubus rhamnifolius* which he had exhibited last year with a shortened inflorescence, and which had died since. He showed further specimens from other bushes, however, and remarked upon them as follows:—(1) *Rubus rhamnifolius*: plants dying owing to some injury caused to the roots. The flower branches or panicles are exceedingly short, and, throwing out roots at the base or at the top bud in an endeavour to form new stools there. (2) *R. carpinifolius*: in the same condition. These conditions may possibly be due to the attack of nematode worms. (3) *R. nitidus* var. *opacus*: flowering stems dying like those already mentioned. The terminal flower-buds have been galled by *Phytoptus* sp. and the flowers have been arrested in growth, while the sepals have undergone phyllody. The short flowering branches have very much reduced, reflexed leaves, the petioles of which are filled with starch granules in excess, and the inflorescence in a condition to form new rooting stools. (4) *R. mucronatus* var. *nudicaulis* with patches of dense velvety hairs on the stems and leaves caused by *Phytoptus* sp.

Carbolic acid as a fungicide.—A letter was read from Mr. Kitley, of the Oldfield Nurseries, Bath, recounting the results of experiments carried out with Tomatos in which the fungi causing "sleepy disease" and other diseases were prevented from developing by watering the soil with a solution of one teaspoonful of carbolic acid to four gallons of water at intervals.

SCIENTIFIC COMMITTEE, OCTOBER, 26, 1909.

Mr. E. A. BOWLES, M.A., F.E.S., F.L.S., in the Chair, and seven members present, and Rev. Aikman Paton, M.A., visitor.

Hybrid Solanums.—Rev. Aikman Paton, M.A., Soulseat, Castle Kennedy, N.B., showed a series of Solanums raised by himself to illustrate the result of crossing *Solanum tuberosum* (a wild form from Mexico) and the white-flowered variety of *S. Commersonii.* He also showed plants and fruits of *S. verrucosum*, *S. etuberosum*, &c. The following is a description of the parents used, and the resulting progeny:—

S. tuberosum (Mexico), wild.—[The Mexican variety used has larger portions of the rhachis bare between the leaflets, fewer leaflets, the terminal leaflets tapering from the base where the lamina is often adnate to the rhachis, and fewer interspersed small leaflets than the Chilian variety.]—Stems, green to purplish, speckled or streaked with green, with wavy green-winged edges. Leaflets, oval, very short stalked, the lamina much raised between the venation, giving the leaves a crumpled appearance, glossy; edges, crenate. Calyx, hairy, with long, tapering, awl-like points, which turn back from the berry. Corolla, rotate-pentagonal; edges, arcuate. Colour, dark lilac [R.H.S. Colour Chart 202, 2 and 3]. Anthers, short, orange-coloured. Style, slightly projecting beyond the stamens. Berries, somewhat rounded, pointed, heart-shaped, with sloping shoulders at stalk end, covered with white spots, especially at the lower half. Tubers, reddish or white with violet tinge.

S. Commersonii (Uruguay), white flowering.—Stems, pale green, violet at nodes, especially in axils; edges, slight, straight, green-winged. Leaves, pale green, sparse. Leaflets, shortly stalked, widely separated on the rhachis, few or no interspersed leaflets, oval obtuse, flat, dull; edges, plain. Calyx, short, blunt, shouldered with short claws. Corolla, star-shaped, deeply segmented, white (sometimes with a violet tinge on base of back of petals). Stamens, long, thin, lemon coloured (paler than those of *S. tuberosum*). Style, much exserted. Berries, larger than those of *S. tuberosum*, heart-shaped, dimpled at stalk end, with sulcus down the middle always visible at stalk end, and, especially if seedless, with few spots. Tubers, yellowish white, warty (lenticels).

Hybrids of above.—Stems, dark violet, rounded triangular; edges, winged, green, straight. Leaves, dark green. Leaflets, oval, obtuse, flat, plain-edged, dull. Calyx, short, blunt, shouldered, with short claws (sometimes triangular tapering, with longer claws). Corolla, always lilac [No. 202, 4 and 3], rotate-pentagonal. Style, much exserted. Stamens, pale yellow, long. Berries, bluntly heart-shaped, full at top, covered with whitish spots on lower half. Tubers, white, with large lenticels like *S. Commersonii.* A comparison of the hybrids with their parents shows that the hybrids have the form of stem, the form and colour of foliage, and the habit and general appearance of *S. Commersonii.* The calyx is generally that of *S. Commersonii.* The flower in form and colour is that of *S. tuberosum*, the shade only different [No. 202, 4 and 3]. The berry is intermediate, shaped like that of *S. Commersonii*, but blunter and thicker, and spotted like that of *S. tuberosum.*

The cross above described is particularly interesting, in view of the fact that very rarely has *Solanum Commersonii* been got to produce fertile seed. Mr. A. W. Sutton, V.M.H., has obtained some, but, besides this, no one appears to have done so, although the plant has been widely grown. The Committee, on the motion of Mr. A. W. Sutton, unanimously recommended the award of a Silver Knightian Medal to Mr. Paton for his interesting exhibit.

Potato tubers.—Mr. A. W. Sutton showed a series of tubers of various Solanums as follows:—1, *Solanum Commersonii* (white-flowered form); 2, (seedling from No. 1), *Solanum Commersonii* (white-flowered), selfed 1906. These tubers showed a distinct break from those of the parent, the skin being of a different colour and the tubers of a different shape. 3, *Solanum Commersonii*, Fitzherbert's form; 4, *Solanum Commersonii* (violet-flowered form); 5, (seedling from No. 4), *Solanum Commersonii* (violet-flowered) selfed; 6, *Solanum Ohrendii*; 7, *Solanum Maglia*; 8, *Solanum Maglia* × commercial Potato; 9, (seedling from No. 8), *Solanum Maglia* hybrid × commercial Potato, selfed; 10, *Solanum etuberosum.*

Virescence in Crepis virens.—Mr. Holmes, F.L.S., showed a plant of *Crepis virens* in which the individual flowers had become stalked, and in place of a pappus a calyx had developed. The capitulum looked very like the inflorescence of an umbelliferous plant.

The colonization of a river bank.—Mr. Fraser, F.L.S., made some remarks concerning the colonization of the bank of the River Thames. A piece of the bank had fallen away, and this year upon the newly-bared earth the following plants had appeared. The first two are exceedingly uncommon colonists of such places. *Platanus acerifolia*, or London Plane; *Coronilla varia*; seedling of *Salix alba*, *S. fragilis*, *S. Caprea*, *S. cinerea*, *S. viminalis*; *Alnus glutinosa*; *Radicula* (*Nasturtium*) *amphibium*, *R. sylvestre*, *R. palustre*; *Melilotus officinalis*, *M. indica*; *Solanum Dulcamara*, *S. nigrum*; *Mentha aquatica*, *M. subglabra*, *M. arvensis*; *Polygonum Convolvulus*, *P. Persicaria*, *Parietaria officinalis*; *Angelica sylvestris*, *Lycopus europaeus*, *Sambucus nigra*, *Senecio aquaticus*, *Scrophularia aquatica*, *Oenanthe crocata*, *Lythrum Salicaria*, *Veronica Anagallis* and *Barbarea vulgaris.*

Salix lanata.—Mr. Fraser recounted how he had discovered this rare alpine willow, and showed specimens. The plant does not appear to thrive in many gardens, but there are fine specimens in the garden of the Society at Wisley, and in the Botanic Gardens at Birmingham.

Pruning after planting.—A communication dealing with the question of the wisdom of pruning immediately after planting trees was received from Mr. J. Landsell and is printed at p. 384.

Dorstenia Walleri.—Mr. Chittenden showed a plant of this interesting species from the Society's garden, grown from a tuber received from Central Africa. The species was first described in the *Gardeners' Chronicle*, August 12, 1893, p. 178, plants having been raised at Kew from seed received from Central Africa. Like other plants of the genus the green inflorescence is flattened, and bears the flowers like an opened fig upon the flattened stem; the margin of the inflorescence is raised somewhat, and gives rise to four or five coarse, long, tapering filaments.

Acorns refused by stock.—Mr. Bowles showed some Acorns from three trees at Myddelton House, Waltham Cross, which neither cattle nor sheep would eat. Mr. Holmes took them for further examination.

Abnormal bulb formation in Nerine.—Mr. Worsley showed a curious bulb of *Nerine* which had developed at the apex of a flattened process somewhat similar to that seen in the bulbs of *Vallota*. The occurrence of a bulb in the position assumed by this is unique in Mr. Worsley's experience of Nerines, and he considered it probable that it was owing to the diseased condition of the basal part of the bulb.

SCIENTIFIC COMMITTEE, NOVEMBER 9, 1909.

Mr. E. A. BOWLES, M.A., F.E.S., F.L.S., in the Chair, and nine members present.

Variation in Primulas.—From the garden of Sir Arthur Hort, Bart., came red flowers of Primroses which in the spring bear blue flowers. It was suggested that the change may be due to the cell sap being acid in reaction instead of alkaline, owing perhaps to some variation in external conditions, such as temperature. Mr. Hill, M.A., drew attention to the fact that several Primulas had varied in the same directions as *P. sinensis*, particularly noting the fimbriation of the edges of the petals which occurred in *P. obconica*, *P. japonica*, *P. Sieboldii*, and now in *P.* × *kewensis*. He enquired whether any member of the Committee had noticed similar variations in the common Primrose, *P. acaulis*. Mr. Chittenden said he had once seen a plant, with the edges both of the petals and sepals much cut, in a cottage garden at Chelmsford, but no other member of the Committee had noticed any. Mr. Douglas and Mr. Fraser pointed out that if seedlings showed signs of roughness at the edges of the petals they would be discarded immediately by florists, and no record would be kept. The Committee would be glad to hear of instances of parallel variations in different species of *Primula* under either natural conditions or when cultivated. For instance, double forms of *P. acaulis* are well known in gardens, but appear to be very rare wild; and there seems to be only one record of their being raised from seed (by Mr. Murray Thomson, *in litt.*). Doubling of a similar nature has occurred in *P. sinensis*.

Scilla socialis.—Mr. Ledger showed a specimen of this uncommon Natal plant, flowering profusely. It was figured by the late Mr. Wilson Saunders in "Refugium Botanicum," t. 180, and the present plant appeared to be a direct descendant of the plant originally figured.

When treated liberally, it appears to increase fairly rapidly, though slow to grow when starved, numerous plants forming around the central one.

Frost, plant injured by.—Mr. J. Fraser, F.L.S., showed specimens to illustrate the damage done by frost acting under varying conditions, *e.g.* Bracken growing in the open (near London) became quite black, while under an Oak tree it remained green. *Solanum nigrum* varied considerably in the extent to which individuals suffered; the pernicious weed, *Galinsoga parvifolia*, originally from Peru, now too common in market gardens in Surrey and Middlesex, was blackened by 4° to 5° of frost; but *Chrysanthemum frutescens*, from the Canaries, was uninjured. While *Datura Stramonium* was killed, its fruits were uninjured, and it persists as a weed in this country partly on this account, but also because the seeds from any particular pod do not all germinate in the same season.

Malformed Orchids.—Mr. G. Wilson, F.L.S., showed malformed *Lycaste Skinneri*, *Odontoglossum*, and *Cattleyas*, upon which Mr. Rolfe, A.L.S., who examined them, reported as follows: "The flower of *Lycaste Skinneri* has a free, dark purple filament, ¾ in. long, opposite to one of the side lobes of the lip, and as the latter has lost its colour and become like the petals in texture, it is an evident case of replacement. There are three flowers of *Cattleya labiata*, one in which the lip has reverted to a simple petal, giving a regular perianth, while the column is straight and has an additional perfect anther, showing that one side lobe of the lip has been developed as an anther, while the other has been suppressed. In a second flower the sepals have become petal-like in shape and colour. In the third flower there are two sepals, two petals, and a slender column and anther, the lip being totally suppressed, and the flower dimerous. The other is a three-flowered inflorescence of *Odontoglossum crispum* in which the column is abortive in each case, and the lip rather full, though otherwise normal."

Trifolium hybridum malformed.—Mr. H. T. Güssow, of the Central Experimental Farm, Ottawa, Canada, sent some specimens of *Trifolium hybridum*, which were sent to the botanical division of the Experimental Farms, Ottawa, Ontario, Canada, by a farmer whose crop showed a peculiar development throughout. The heads were produced in axillary, compound, long-peduncled umbels. The umbels measured from ¼ in. to 1 in. in breadth, and were 8 to 26 rayed. The pedicels were from 2 to 4 mm. long, flattened, and 1 mm. broad. Involucre none, or reduced to several scale-like bracts, 1 mm. long, acutely linear; involucel, scale-like, membranous bracts 1½ to 2 mm. long, umbellets 6 to 12 flowered. The flowers, unfortunately, could not be examined, as they had not sufficiently developed. Any botanist might have been puzzled to identify the plant if the inflorescences only had been sent. The plant at first sight looked more like an umbelliferous than a leguminous plant.

SCIENTIFIC COMMITTEE, NOVEMBER 23, 1909.

Mr. E. A. BOWLES, M.A., F.L.S., in the Chair, and nine members present.

Potentilla with virescent flowers.—Mr. Holmes, F.L.S., showed a flower of *Potentilla* sp., in which the carpels were leafy. He also reported that the acorns which stock refused to eat, shown by Mr. Bowles, were those of *Quercus pedunculata*, and showed no morphological difference from the ordinary form characteristic of that plant.

Monstrous Apple flower.—Mr. Pickering, F.R.S., showed the flower of Bramley's Seedling Apple, having twenty-five petals, but otherwise completely formed.

Garden Pansies.—Mr. Fraser, F.L.S., referred to the degeneration of the flowers of garden pansies when allowed to seed themselves in cultivated ground. He found that bees, cabbage butterflies, and other insects, but especially the silver Y moth, visited them with great regularity, and it seems probable that the degeneration is due to crossing.

Cattleya with diphyllous growth.—Mr. Hawkes, Osterley Park Gardens, sent a growth of *Cattleya Gaskelliana* which had produced two leaves. This condition, Mr. Rolfe, A.L.S., said, is probably a reversion to an ancestral type, and is occasionally seen in other monophyllous Cattleyas. Mr. Hawkes also sent a vigorous shoot of *Rochea* (*Kalosanthes*) *coccinea*, having at the apex of the stem numerous shoots about 6 inches long, instead of flowers. The Committee thought that the condition was the result of growing the plant in a moist atmosphere, an opinion confirmed by the fact that roots had made their appearance at the apex of the main stem.

Juglans Ailanthifolia fruiting.—Mr. Gumbleton sent ripe fruits of *Juglans Ailanthifolia* from his garden at Belgrove, Queenstown. This is the first time the tree has fruited since Mr. Gumbleton planted it thirty years ago. The fruits are dark and velvety in appearance, smaller than those of *J. regia*, and are borne six to eight in a raceme. Mr. Gumbleton said that, so far as he was aware, the tree had only once before fruited in the kingdom, at Abbotsbury, in Dorsetshire.

Bitter-Rot in Pears.—From Mr. Rogers, Hexworthy, Launceston, came Pears attacked by the fungus *Gloeosporium fructigenum*, causing the "bitter-rot." It was stated that "the disease seems to begin as small rounded brown patches on the outside, and, in some cases, if these are cut out, the rest of the pear is quite good, but in other cases, although the inside of the pear looks quite good, a strong bitter flavour goes right through it. The varieties which have suffered most are 'Thompson,' 'Fondante d'Automne,' and 'Beurré Hardy'; 'Louise Bonne' has also suffered a good deal, and some other varieties slightly, but 'Durondeau' not at all." The fungus is said to form canker spots on the stems, and these should be cut out, and, with the pears, destroyed by fire. If thrown on the rubbish heap, or if the diseased fruits are allowed to rot on the ground, or are fed to pigs, there is a danger of the spores escaping and attacking the fruit next year. The spores produced on diseased fruits in the store are able to attack and cause disease in neighbouring fruits. The disease is to be kept in check by the destruction of the diseased fruits, as recommended, and the spraying of the trees with potassium sulphide or ammoniacal copper carbonate. If, however, the trees are sprayed against "scab," that operation will tend to keep the "bitter-rot" in check.

Fruit-growing Experiments.—The Council awarded a Certificate of Appreciation to His Grace the Duke of Bedford and Mr. Spencer Pickering, F.R.S., for an exhibition of fruit showing the results of experiments in fruit-growing in consideration of its value from an educational point of view. The following account of the exhibit was drawn up by Mr. Pickering:

The apples exhibited represented, both as regards total weight and size of fruits, the crops obtained during the past fifteen years from dwarf trees on paradise stock under different treatment. The variety shown was Bramley's Seedling; similar results have been obtained with Cox's Orange Pippin and Potts' Seedling. Three hundred and sixty trees of each of these varieties were planted in 1894 for these experiments.

The "values" of the crop are obtained by multiplying the total weight of fruit by the average weight of the individual fruits, and these values are in every case compared with that of the crops from similar trees under normal treatment, expressed as one hundred. Normal treatment consisted of planting carefully, cutting back at once afterwards, pruning lightly every year, keeping the ground clean, and giving a moderate dressing of a general artificial manure annually.

BRANCH PRUNING.

No pruning	Value 131
Light pruning (normal)	„ 100
Rather harder pruning	„ 71
Hard pruning	„ 28
Summer pruning	„ 70

From these results it appears that the less pruning is done, consistent with keeping the trees sturdy and in shape, the better. Similar results have been obtained with over one hundred other varieties; but weak growing or precocious varieties, naturally, require more pruning.

It is noticeable that the average size of the fruits has not deteriorated through lack of pruning, whilst the trees are in every respect larger in proportion as pruning has been reduced.

The summer pruning in the above experiment is actual pruning, not mere stopping or pinching.

ROOT PRUNING.

No root pruning (normal) . . .	Value 100
Root pruned every fourth year . . .	„ 44
Root pruned every second year . . .	„ 7
Root pruned every year . . .	„ 1½

These results illustrate the severity of the check given to a tree by pruning its roots, and tell strongly against indulging in the practice, unless such a check is required. If severe branch pruning is adopted, root pruning may do good, by re-establishing the balance between branches and roots.

MANURING.

Deficient or no dressing	Value 108
Moderate dressing (normal) . . .	„ 100
Heavy dressing	„ 100

In the many experiments on this subject, artificial manure or dung was used, the moderate dressing being one of, or equivalent to, twelve tons of dung to the acre. The heavy dressings consisted of two or three (in one case ten) times this amount. Although the soil is by no means specially rich, these dressings, during fifteen years, have had no appreciable effect on the trees or the crops. Possibly they will have eventually. Similar experiments in a poor sandy soil have yielded positive results within four or five years.

Though apples have not been affected by manures in our soil, these (especially dung) have been found to be absolutely essential for bush fruits and for ordinary farm crops: thus illustrating the great differences in the requirements of different crops. Farmers are advised not to spend money in manuring apple trees without positive evidence that such manuring will have a good effect in their particular soil.

EFFECT OF GRASS, ETC.

Ground tilled (normal)	Value 100
Laid down to grass at once . . .	„ 10
Laid down to grass after four years . .	„ 27
Effect of grass 5½ feet from the trees .	„ 83
Ground becoming weed-grown	„ 16

The effect of sowing grass over newly planted trees is all but fatal; the above values understate the effect, as, during the last few years, the roots have been extending beyond the grassed area. Grassing over well established trees has proved almost as deleterious. Further results on grassing trees established for twelve years will be found below.

Besides stunting the tree and reducing the crop, grass strongly affects the colour of the bark, foliage and fruit: the latter assumes either a waxy yellow colour or a bright red. In the latter case the result may be advantageous for market purposes, provided the action is not carried too far, *i.e.* by confining the grass to a certain distance away from the stems. The gradual establishment of weeds and grasses does not affect the trees so much as laying the land down to grass at once.

Precisely similar results have been obtained with standard apples on the crab stock.

The effect of grass varies considerably in different soils, but hardly any instances have been met with where the effect is nil. The explanation is at present obscure, but it has been proved not to depend on questions of moisture, food supply, or air, and is, in all probability, due to some active poison.

PLANTING.

Carefully planted; trenched (normal) .	Value 100
Carefully planted; untrenched . . .	„ 209
Carelessly planted and neglected . .	„ 13
Carelessly planted, then tended . .	„ 105

The effect of trenching must vary greatly in different soils, and, if accompanied by a liberal digging-in of manure, may, in many cases, be beneficial: in our case it has been very much the reverse (though the above results may be accidentally too high), and all the money spent in trenching our ground has certainly been wasted.

Careless planting, accompanied by neglect of the soil (except that manure has been given) and trees, has proved disastrous, but this must be attributed solely to the neglect—chiefly to not tilling the ground—and not to the careless planting; for a set of trees, planted in the same way, recovered at once as soon as the soil was tilled (one year after the planting), and have been quite as profitable as their properly planted neighbours.

GRASSING ESTABLISHED TREES.

Half an acre of mixed plantation was taken twelve years after planting, and half of it was laid down to grass, the other half being kept tilled. Some effect was noticeable even in the first year, and now, in the third year, the grassed trees of most of the varieties are so affected that they will probably die if the grass is not removed. One or two varieties have not suffered much yet. The following are the relative values of the crops this year, chiefly from standard trees.

		Tilled.	Grassed.
Warner's King	Value	100	100
Newton Wonder . . .	„	100	60
Gascoyne's Scarlet . . .	„	100	31
Yellow Ingestrie . . .	„	100	30
Golden Noble	„	100	18
New Northern Greening . .	„	100	3
Peasgood's Nonsuch . . .	„	100	2

SCIENTIFIC COMMITTEE, DECEMBER 7, 1909.

Mr. J. T. BENNETT-POË, M.A., in the Chair, and eight members present.

Lobelia thapsoidea.—Mr. Worsley showed flowers of this species, a tall-growing plant, reaching 7 feet in height, seeds of which he had collected at the summit of the Organ Mountains, in Mexico.

Saxifraga tridactylites.—Mr. Fraser, F.L.S., showed specimens of this plant growing vigorously in a pot, reaching a size considerably greater than that attained in its usual habitat, such as the tops of walls and similar places in the British Isles. The seed had been collected at Weybridge, and the plants were now commencing to flower. He remarked that the plant had a wide distribution through the north temperate zone, and that, although in this country it was confined to such situations as the tops of walls, on the Continent it grew among pasture plants and appeared able to compete with them.

Psychotria jasminiflora.—Foliage cut from a seedling of this plant, raised by Mr. George Lee, Clevedon, was sent, illustrating the difference between the juvenile and adult forms of leaves, the latter being much broader in proportion to their length than the former, and also considerably larger. The seed had been produced eight years ago by a plant at Clevedon, and it appears rare to find it fruiting in this country, though the plant is often cultivated and is well known under the name of *Gloneria jasminiflora.*

Trees attacked by voles.—Examples of maiden Apple trees with their bark bitten off below the ground level all round the stem, and the roots eaten, were received from Chard, Somersetshire. The committee was of opinion that the damage was the work of field voles. It was pointed out that the best way of checking the spread of these pests was by encouraging owls and kestrels. They may sometimes be trapped by digging pits wider at the bottom than the top, and they may be driven away by injecting carbon-bisulphide into the soil at the rate of about ½ ounce to the square yard, or by the use of paraffin poured in small quantities around the trees, taking care not to touch the trees with the liquid.

Malformed Cyclamen.—From Mr. Rickards, of Usk Priory, Monmouth, came a malformed *Cyclamen*, having the sepals developed into foliage leaves.

SCIENTIFIC COMMITTEE, DECEMBER 21, 1909.

Mr. E. A. BOWLES, M.A., F.E.S, F.L.S., in the Chair, with four members present, and Mr. G. Wilson, F.L.S., visitor.

Nomenclature of Garden hybrids and varieties.—The Committee had under consideration a number of questions referred to the Society by the Committee of the Brussels Horticultural Congress. Replies to these questions were drafted and the matter referred to the Chairman and Secretary to cast in a more complete form and send to the Secretary of the Congress, M. Cogniaux.

Seedling Oncidium.—Mr. Wilson, F.L.S., showed a flower of a hybrid *Oncidium* (*O. tigrinum* × *O. lamelligerum*) raised by Messrs. Charlesworth. This is the first recorded seedling of an *Oncidium* raised in this country.

Chlorosis in Laurels.—Mr. J. W. Odell showed specimens of Laurels from Hampshire with yellowish foliage. This condition may be due to any of a variety of causes, and the green colour is frequently recovered after an application of sulphate of iron. It is perhaps most frequent where chalk forms the subsoil.

FRUIT AND VEGETABLE COMMITTEE.

September 9, 1909.

Sub-Committee at Wisley.

Mr. Owen Thomas, V.M.H., in the Chair, and five members present.

The following Potatos, Cauliflowers, and Beans were highly commended **(XXX)**:—

Potatos:—

*6. 'Duchess of York,' from Mr. W. G. Holmes, Tain.
56. 'Mr. R. Vere O'Brien,' from Mr. T Collins, Kilnaboy, Co. Clare.
94. 'Widecombe Intermediate,' from Rev. J. Pickering, Ashburton.
96B. 'Pride of Dumfries,' from Messrs. Barr, Covent Garden.
97B. 'Scottish Chief,' from Messrs. Barr, Covent Garden.

Cauliflower:—

9. 'Conqueror,' from Messrs. Vilmorin, Paris.
14. 'Dwarf Erfurt,' from Mr. F. C. Heinemann, Erfurt.
17. 'Dwarf Mammoth,' from Messrs. Carter, Holborn.
18. 'Earliest of All,' from Messrs. Cannell, Loddon, Norwich.
24. 'Early Snowball,' from Messrs. Barr, Covent Garden.
29. 'Extra Early Autumn Giant,' from Messrs. Carter, Holborn.
34. 'King of Cauliflowers,' from Messrs. Barr, Covent Garden.
36. 'Magnum Bonum,' from Messrs. Sutton, Reading.

Runner Beans:—

17. 'Prizewinner,' from Messrs. Carter, Holborn.
18. 'Red Giant,' from Messrs. Carter, Holborn.
20. 'Scarlet Emperor,' from Messrs. Carter, Holborn.
23. 'White Emperor,' from Hon. V. Gibbs, Elstree (gr. Mr. E. Beckett).

Climbing French Beans:—

3. 'Count Zeppelin,' from Mr. F. C. Heinemann, Erfurt.
4. 'Dark Dun,' from Messrs. Carter, Holborn.
12. 'Princess of Wales,' from Messrs. Sutton, Reading.
13. 'Reselected,' from Messrs. Carter, Holborn.

Fruit and Vegetable Committee, September 14, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended:—

Gold Medal.

To Messrs. G. Bunyard, for pot fruit trees.

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* See footnote, p. 429.

Silver-gilt Knightian Medal.

To Messrs. Dobbie, Rothesay, for Potatos.

To Lord Llangattock, Monmouth (gr. Mr. T. Coomber), for Grapes and Melons.

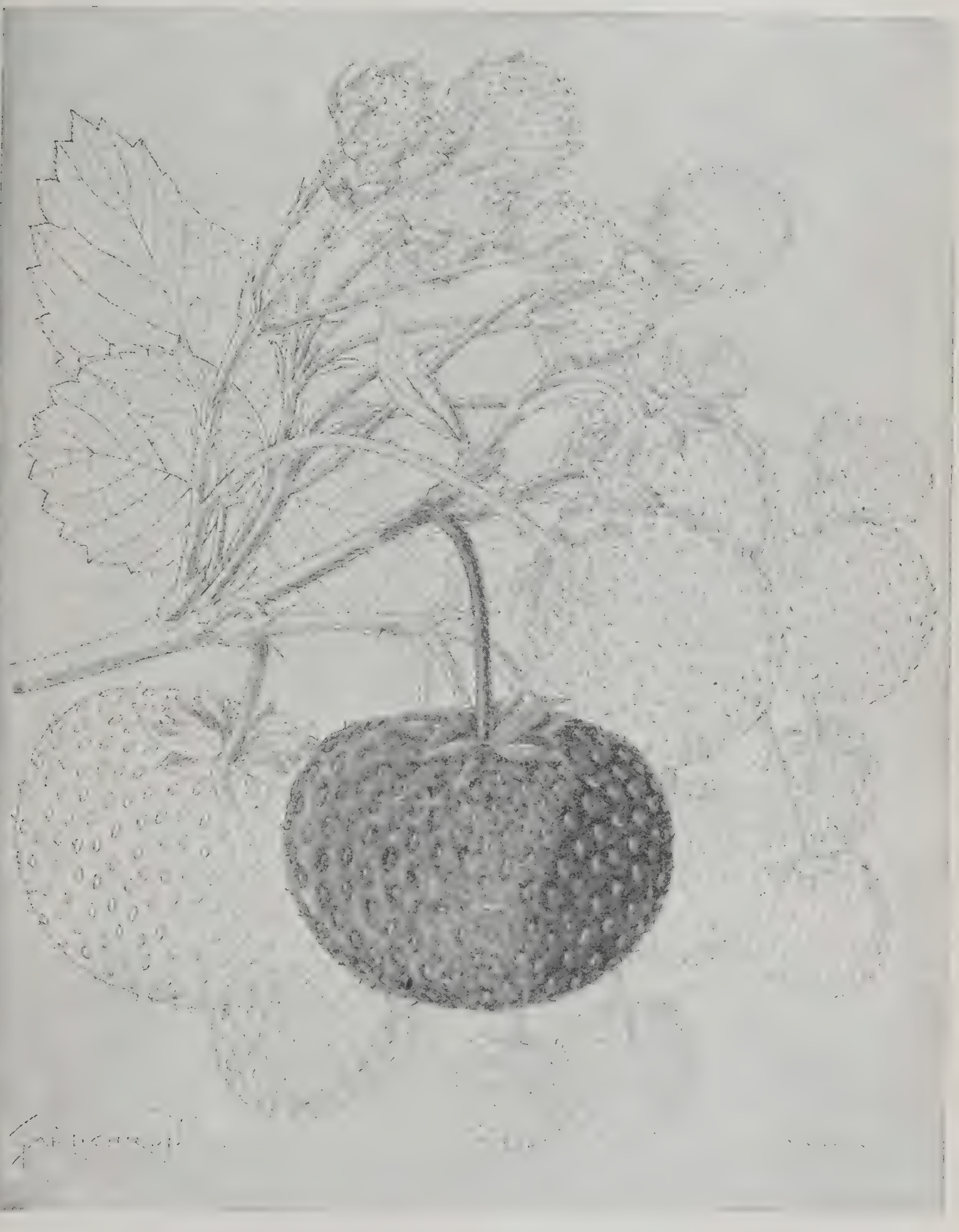


Fig. 141.—Strawberry, 'Laxton's Perpetual.' (*Laxton.*) (p. ccxxxviii.)

To C. F. Raphael, Esq., Shenley (gr. Mr. A. Grubb), for vegetables.

To Lady Wantage, Wantage (gr. Mr. W. Fyfe), for fruit.

Silver-gilt Banksian Medal.

To Sir M. Collet, Bart., Sevenoaks (gr. Mr. Nicholls), for pot-grown Pears.

Silver Knightian Medal.

To H. B. Brandt, Esq., Nutfield, Surrey (gr. Mr. T. Heron), for Grapes.

Silver Banksian Medal.

To W. Astor, Esq., Taplow (gr. Mr. W. Camm), for Grapes, grown in paraffin casks cut in halves.

To M. Drummond, Esq., Welwyn, Herts (gr. Mr. Kelf), for Plums.

To Messrs. S. Low, Enfield, for fruit trees in pot.

Award of Merit.

To Strawberry, 'Laxton's Perpetual' (votes unanimous), from Messrs. Laxton, Bedford. Shape variable, solid scarlet flesh, with prominent yellow seeds, and of good flavour. (Fig. 141.)

The following were highly commended (**XXX**) after trial at Wisley (see p. ccxxxvi).

Potatos :—'Duchess of York,' 'Mr. R. Vere O'Brien,' 'Widecombe Intermediate,' 'Scottish Chief.'

Cauliflowers :—'Conqueror,' 'Dwarf Erfurt,' 'Dwarf Mammoth,' 'Earliest of All,' 'Early Snowball,' 'Extra Early Autumn Giant,' 'King of Cauliflowers,' 'Magnum Bonum.'

Runner Beans :—'Prizewinner,' 'Red Giant,' 'Scarlet Emperor,' 'White Emperor.'

Climbing French Beans :—'Count Zeppelin,' 'Dark Dun,' 'Princess of Wales,' 'Reselected.'

Other Exhibits.

G. E. Dyke, Esq., Milborne Port, Somerset: seedling Apples.

Mr. G. W. Miller, Wisbech: Apple 'Red Victoria.'

C. H. Pike, Esq., Malmesbury, Wilts: plant and fruit of the 'Wonderberry.'

Messrs. Storrie, Glencarse, Perth: seedling apples.

FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 28, 1909.

Mr. GEO. BUNYARD, V.M.H., in the Chair, and twenty members present.

Awards Recommended :—

Gold Medal.

To Messrs. Rivers, Sawbridgeworth, for fruit trees in pots.

To Messrs. J. Veitch, Chelsea, for fruit trees in pots.

Silver-gilt Knightian Medal.

To Messrs. H. Cannell, Eynsford, for fruit.

To Mr. G. Hobday, Romford, for vegetables.

To J. A. Nix, Esq. (gr. Mr. E. Neal), Crawley, for fruit.

Silver-gilt Banksian Medal.

To Mrs. G. Banks, Grosvenor Square, W., for preserves.

Silver Knightian Medal.

To Messrs. J. Veitch, Chelsea, for vegetables.
To Messrs. Spooner, Hounslow, for fruit.

First-Class Certificate.

To Apple 'St. Everard' (votes, unanimous), from Messrs. J. Veitch, Chelsea. This variety received an Award of Merit on September 11, 1900; see R.H.S. JOURNAL, vol. xxiv. p. lix. Fruit rather below medium size, of perfect form; eye prominent, open, with reflexed segments; stalk ¾ inch long, thin, inserted in a shallow cavity; skin nearly covered with red, and spotted with pale spots; flesh crisp, tender, and of very good flavour. (Fig. 142.)

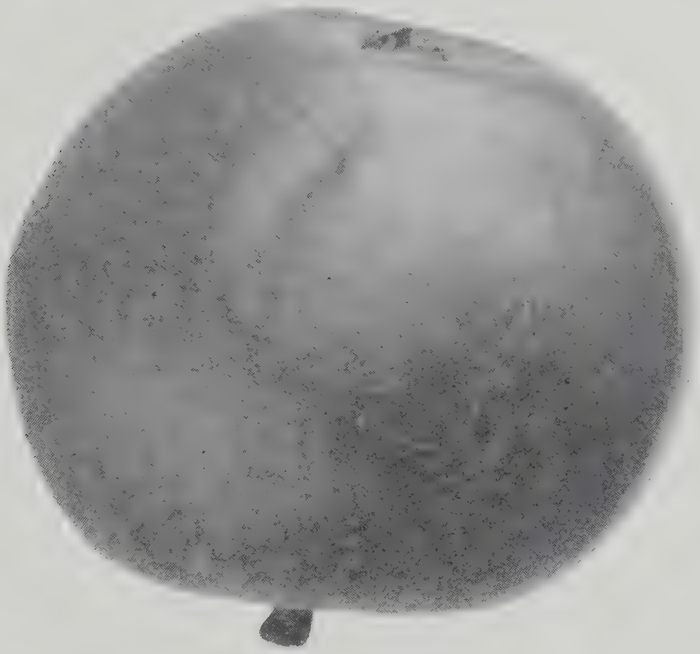


FIG. 142.—APPLE 'ST. EVERARD.' (*J. Veitch.*)

Award of Merit.

To Runner Bean 'White Emperor' (votes, unanimous), from Hon. V. Gibbs. See Report of Wisley Trials (p. 485).

To Strawberry 'Atkin's Continuity' (votes 14 for), from Mr. J. Atkin, Beckenham. Fruits round, with very prominent yellow seeds; flesh deep red, crisp, of excellent flavour. A very free and continuous cropper. (Fig. 143.)

Other Exhibits.

Messrs. Barr, Covent Garden: new Melon.
W. Bates, Esq., Twickenham: Langley Bullace.
Sir M. Collet, Bart., Sevenoaks: Pear 'Calebasse Oberdick.'
H. E. Cross, Esq. (gr. Mr. W. Smith), Worplesdon: Pear 'Sanguinole Rouge.'

G. E. Dyke, Esq., Milborne Port, Somerset: Apple 'Mabel.'
Lady Halton, Ludlow: Apple 'Earl of Plymouth.'
D. Hunt, Esq., Beckenham: Tomatos.
Messrs. Laxton, Bedford: Plums.
Messrs. Low, Enfield: Peach.
Messrs. G. W. Miller, Wisbech: Apple 'Red Victoria.'

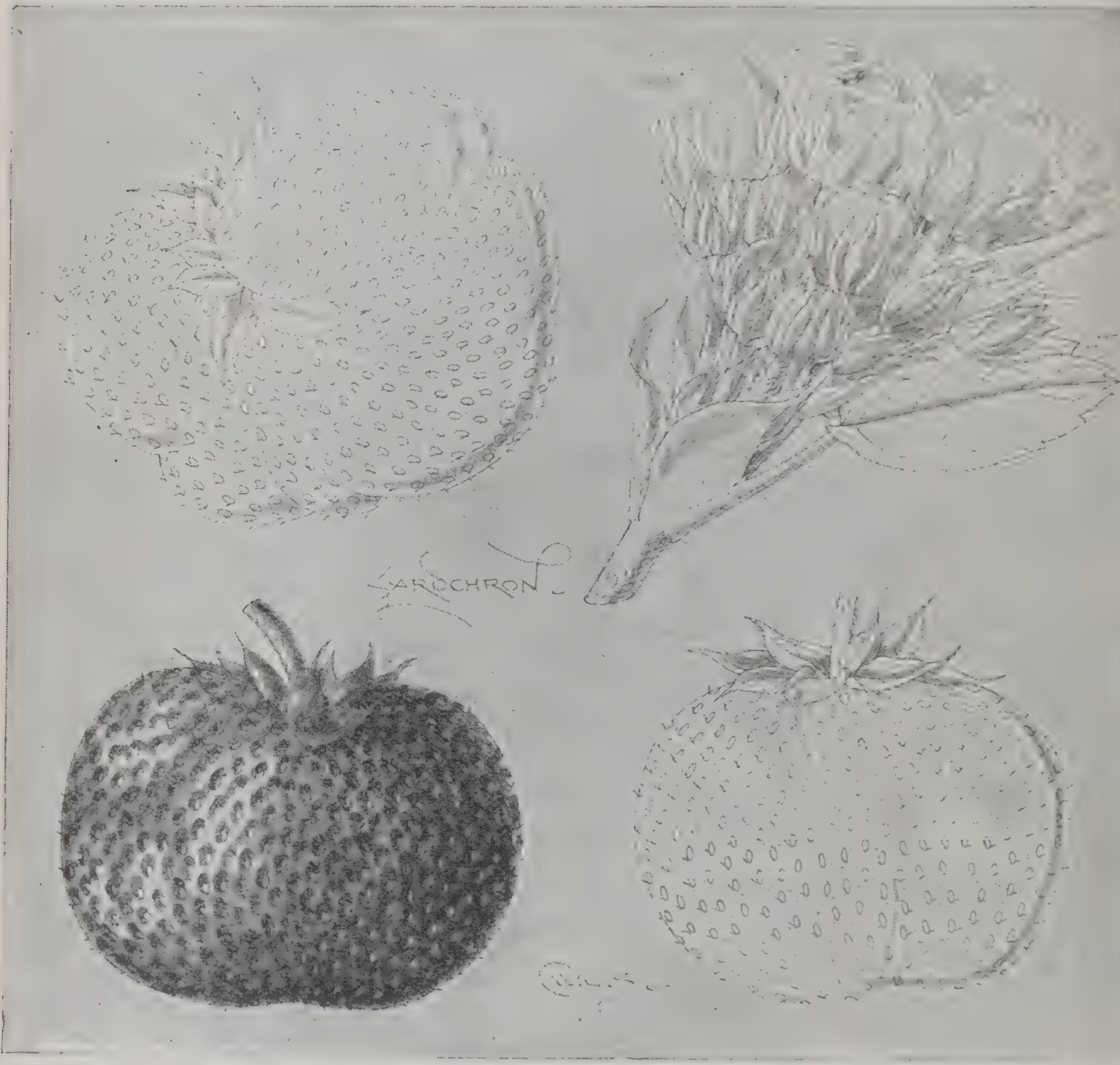


FIG. 143.—STRAWBERRY 'ATKIN'S CONTINUITY.' (*Gardeners' Chronicle.*)
(p. ccxxxix.)

Messrs. Searle, Chipping Ongar: Nectarine.
Messrs. Storrie, Glencarse: Apples.
H. Train, Esq., Yetminster: seedling Apple.
Mrs. Trotter, Barnet: White Grape (sport from Black Hamburgh).

Fruit and Vegetable Committee, October 12, 1909.

Mr. Geo. Bunyard, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended :—

Gold Medal.

To Hon. V. Gibbs, Elstree (gr. E. Becket, V.M.H.), for a collection of vegetables.

Silver-gilt Knightian Medal.

To Messrs. Bunyard, Maidstone, for fruit.
To Messrs. Cheal, Crawley, for fruit.
To the Kingsacre Nurseries, Hereford, for fruit.

Silver-gilt Banksian Medal.

To M. Price, Esq., Welwyn, for fruit.

Silver Knightian Medal.

To Messrs. Notcutt, Woodbridge, for fruit.
To L. de Rothschild, Esq., Gunnersbury House, Acton, for fruit.

Silver Banksian Medal.

To Miss E. Bradley, Hollingbourne, for bottled fruit.
To Mr. R. W. Green, Wisbech, for Potatos.
To Messrs. Low, Enfield, for fruit.
To Messrs. W. Paul, Waltham Cross, for fruit trees in pots.
To Messrs. Peed and Son, Streatham, for fruit.
To Lady Tate, Streatham Common, for Grapes.

Bronze Knightian Medal.

To Messrs. Massey, Spalding, for vegetables.

Other Exhibits.

Mr. G. Bechley, St. Giles: seedling Apple.
Mr. J. Fulton, Harrow: seedling Apple.
Earl of Harrington, Derby: Tomatos.
Mr. W. Ingall, Louth: seedling Apple.
Mrs. S. Miller, Marlow; bottled fruits, &c.
Messrs. Robson, Hexham, Apple 'Price's seedling.'
Mr. H. Taylor, Stafford: Grapes.
Mrs. Trotter, Barnet: Grape 'Golden Queen.'

Fruit and Vegetable Committee, October 26, 1909.

Mr. G. Bunyard, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Seabrook, Chelmsford, for Apples and Pears.

Silver Knightian Medal.

To the Horticultural College, Swanley, for Apples.
To Messrs. Laxton, Bedford, for Apples, &c.
To Mr. H. Whiteley, Torquay, for Apples.

Silver Banksian Medal.

To M. Drummond, Esq., Welwyn (gr. Mr. Kelf), for Apples and Pears.
To A. E. Humphreys-Owen, Esq., Montgomery, for Apples.
To Messrs. Massey, Spalding, for Onions.
To Messrs. Palmer, Grosvenor Sq., W., for Apples and Pears.

Other Exhibits.

J. Aikman Paton, Esq., Castle Kennedy: Solanums.
G. Cole, Esq., Shillingstone: seedling Apple.
R. Fenn, Esq., Lulhamstead: Potatos.
Mr. W. Knight, Hailsham: hybrid *Rubus*.
Messrs. Laxton, Bedford: Apple 'Lady's Bower.'
Mr. W. Pope, Newbury: Apples.
Mr. G. Pyne, Topsham: Apples and Pears.

FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 9, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended:—

Hogg Medal.

To Messrs. Veitch, Chelsea, for Pears grown in France.

Silver-gilt Knightian Medal.

To the Duke of Rutland, Grantham, for Pears.
To Messrs. Sutton, Reading, for Onions.

Silver Knightian Medal.

To Messrs. J. Veitch, Chelsea, vegetables.

Silver Banksian Medal.

To Mr. W. A. Voss, Rayleigh, for fruit.

Cultural Commendation.

To Messrs. Felton, Hanover Sq., W., for seedling Orange Trees in fruit.

Other Exhibits.

Mr. A. Baird, Reigate: Apple 'Baird's Seedling.'
A. B. Goldschmidt, Park Lane, W.: Beans.
Mr. E. Smith, Elham: seedling Apple.
Messrs. Sutton, Reading: Potatos.

FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 23, 1909.

Mr. G. BUNYARD, V.M.H., in the Chair, and nineteen members present.

Award Recommended:—

Silver Banksian Medal.

To Messrs. Seabrook, Chelmsford, for Apples and Pears.

Other Exhibits.

Messrs. Palmer, Grosvenor Sq.: Apples and Pears.

The Duke of Bedford, Ridgmont, Beds: collection of Apples illustrating the result of experiments in fruit-growing (see p. ccxxxii).

Major J. W. Dent, Wetherby: Apple 'Ribston Pippin' (from original tree).

P. J. Edwards, Esq., Woking: Apple 'Cox's Orange Pippin.'

P. Pionchon, Esq., Shanklin: Apple 'Landguard.'

Rev. H. E. Sculthorpe, Weston-super-Mare: seedling Apple.

FRUIT AND VEGETABLE COMMITTEE, DECEMBER 7, 1909.

Mr. W. POUPART in the Chair, and sixteen members present.

Award Recommended:—

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading, for a collection of Brassicas.

Silver Knightian Medal.

To Hon. V. Gibbs, Elstree (gr. Mr. E. Beckett), for a collection of kales.

To Miss Martin, New York, for bottled fruit.

To Mr. W. B. Shearn, Tottenham Court Road., W., for fruit.

Silver Banksian Medal.

To Mrs. Miller, Marlow, for bottled fruit.

Other Exhibits.

Mr. H. Langston, Pembridge: Apple 'Langston Red Wonder.'

Mr. W. R. Pierce, Canterbury: Apple 'Kentish Quarrenden.'

FRUIT AND VEGETABLE COMMITTEE, DECEMBER 21, 1909.

Mr. C. G. A. NIX in the Chair, and seven members present.

No awards were recommended.

A. Andrews, Esq., Wickham Market, sent a seedling Apple.

FLORAL COMMITTEE.

SEPTEMBER 14, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Carter Page, London Wall, E.C., for Dahlias.
To Messrs. G. Paul, Cheshunt, for ornamental foliage.
To Mr. L. R. Russell, Richmond, for Bamboos.

Silver-gilt Banksian Medal.

To Messrs. Burrell, Cambridge, for Gladioli.

Silver Flora Medal.

To Messrs. May, Upper Edmonton, for Gymnogrammes.
To Mr. S. Mortimer, Rowledge, Farnham, for Dahlias.
To Mrs. Matthews, Anerley, for *Vallota purpurea.*
To Mr. J. T. West, Brentwood, for Dahlias.

Silver Banksian Medal.

To Mr. M. Prichard, Christchurch, for hardy plants.

Bronze Flora Medal.

To Messrs. Cannell, Swanley, for Dahlias.
To Messrs. Cheal, Crawley, for Dahlias and herbaceous plants.
To Messrs. Ware, Feltham, for Asters and Dahlias.

Bronze Banksian Medal.

To Messrs. Barr, Covent Garden, for herbaceous plants and Eucalypti.
To Messrs. Cutbush, Highgate, for hardy flowers.

Cultural Commendation.

To Mrs. Matthews, Anerley, for well-grown specimens of *Vallota purpurea.*

Award of Merit.

To Chrysanthemum 'Leslie' (votes, 12 for), from Messrs. Wells, Merstham. An early-flowering variety, with flowers 3 inches in diameter, of good substance, and rich chrome yellow in colour, slightly deeper in centre, of bushy habit, and about two feet in height.

To Dahlia 'Ed. Mawley' (votes, 7 for, 1 against), from Mr. C. Turner, Slough. A large 'show' variety, with perfectly formed flowers of a rich crimson (fig. 144).

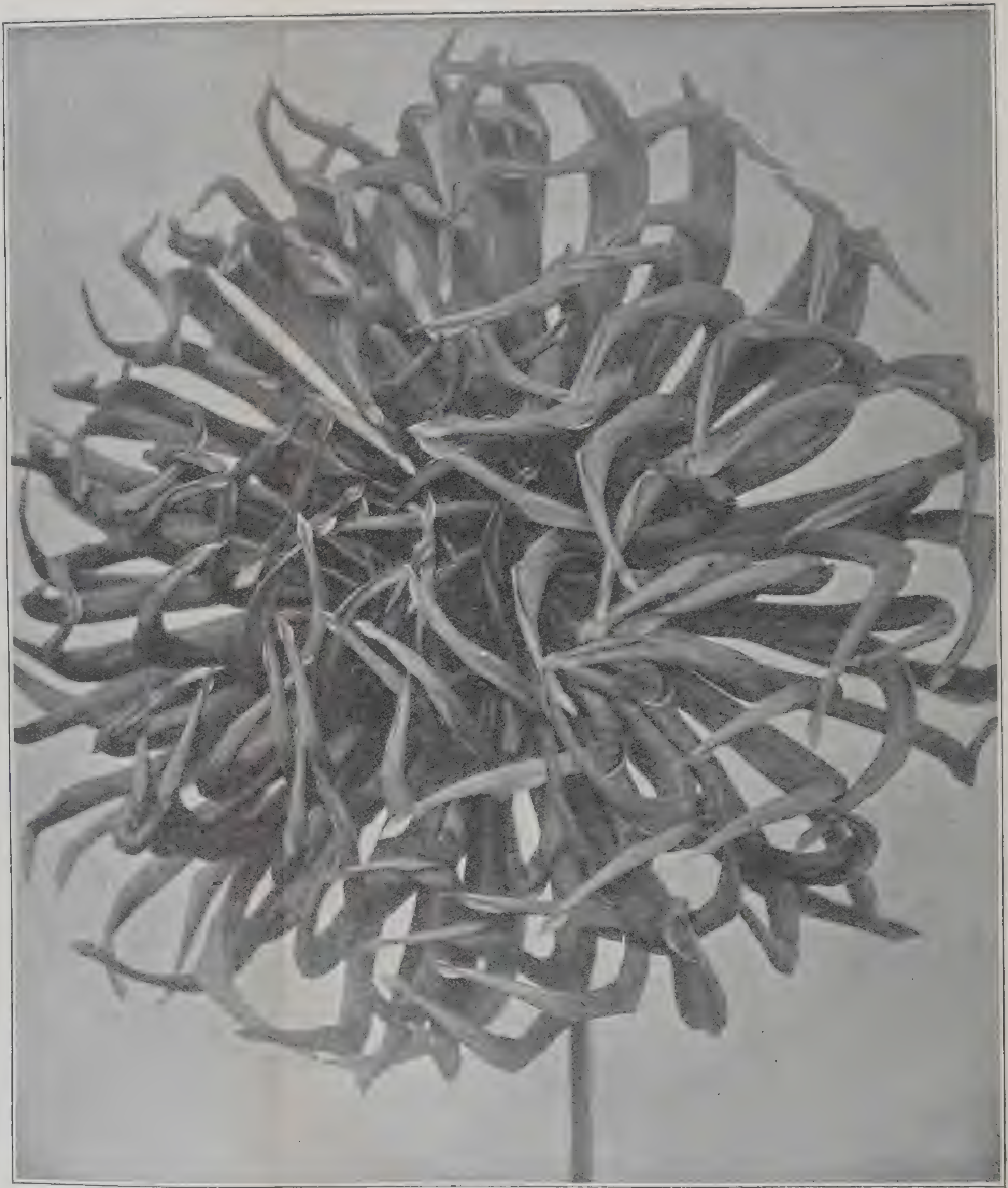


FIG. 145.—CACTUS DAHLIA 'H. H. THOMAS.' (*J. Stredwick.*) (p. ccxlv.

(*To face page* ccxlv.)

To Dahlia 'H. H. Thomas' (votes, unanimous), from Messrs. J. Stredwick, St. Leonards. A 'Cactus' variety, with much curved petals, which make it quite distinct. Flowers of medium size, bright rosy-scarlet. (Fig. 145.)

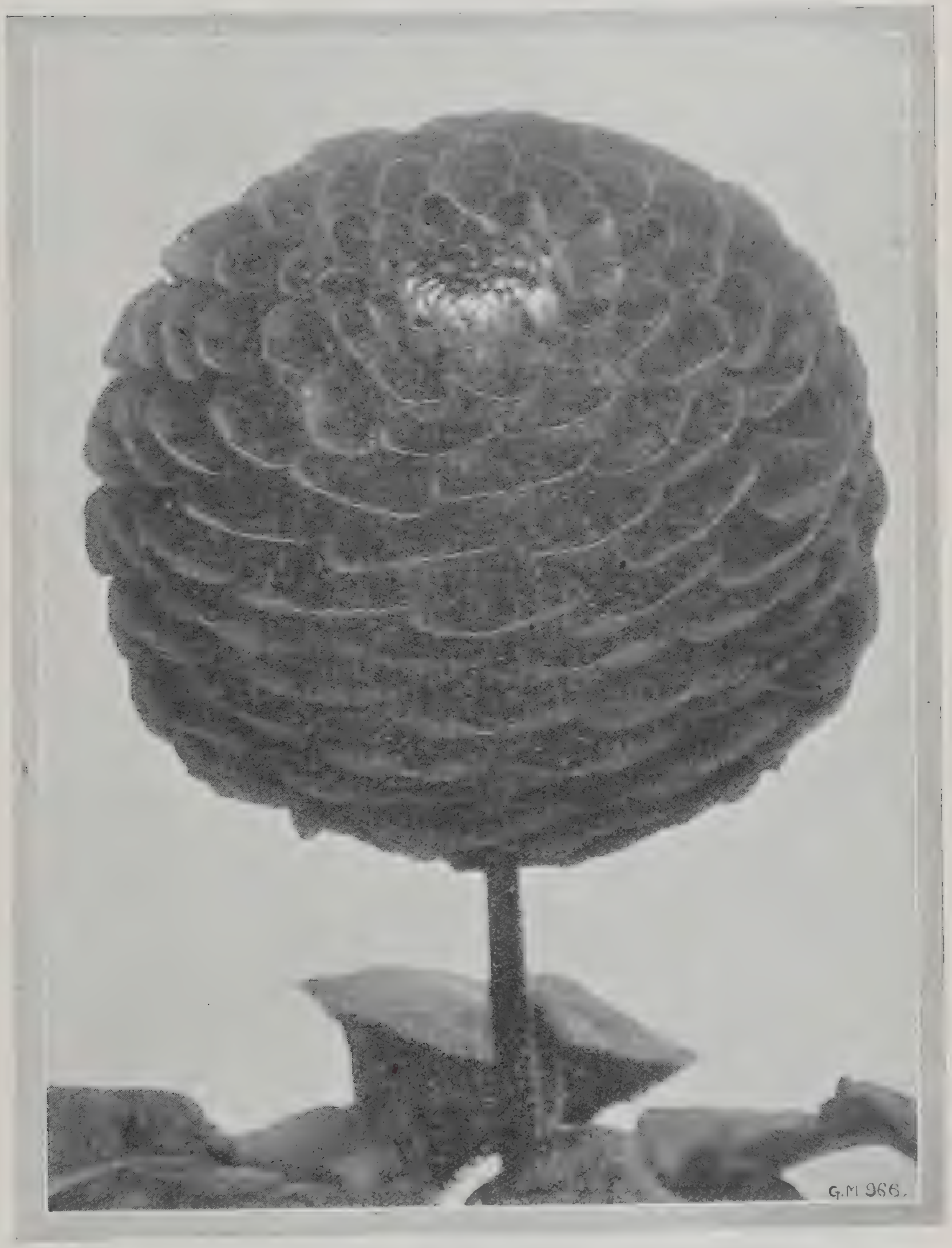


Fig. 144.—Show Dahlia 'Ed. Mawley.' (*From Gardeners' Magazine.*)
(p. ccxliv.)

To Dahlia 'Indomitable' (votes, 11 for, 3 against), from Messrs. Stredwick. A large 'Cactus' variety, petals much curved, mauve, tipped with pale rosy-magenta.

To Dahlia 'Iolanthe' (votes, 11 for, 3 against), from Messrs. Stredwick. A 'Cactus' variety, with slightly curved, broad petals, of good substance, brick red, with yellow base to petals.

To Dahlia 'Jupiter' (votes, 8 for, 2 against), from Messrs. Stredwick; a 'Cactus' variety, petals pale yellow at base, and apricot, flushed rose at tip, irregularly striped crimson.

To Dahlia 'Little Beeswing' (votes, 13 for), from Messrs. Keynes Williams, Salisbury. A 'Pompon' variety less than 2 inches in diameter, of fine form; petals yellow, tinged apricot, delicately edged with scarlet.

To Dahlia 'Prima Donna' (votes, 11 for), from Mr. H. Shoesmith, Woking. A 'Cactus' variety with long slightly curved petals; pure white, with trace of yellow in centre.

To Dahlia 'Red Admiral' (votes, unanimous), from Messrs. J. Stredwick. A large 'Cactus' variety, with curved petals; bright scarlet, slightly tinged buff at base of petals.

To *Helenium* 'Riverslea Beauty' (votes, unanimous), from Mr. M. Prichard, Christchurch. Flowers large, rich chrome yellow, with distinct brown disc.

To *Potentilla atrosanguinea* 'Gibson's Scarlet' (votes, 13 for), from Mr. M. Prichard, Christchurch. Flowers 1¼ inch in diameter, rich fiery scarlet. 2 feet high. Somewhat like *P. formosa.*

To *Rhus sinica* (votes, 8 for), from Messrs. G. Paul, Cheshunt. Branches slender, leaves opposite, ovate, attenuate at the apex, pale green changing to bright glowing crimson, deeper above than beneath.

Other Exhibits.

Mr. F. M. Bradley, Peterborough: Rose 'Climbing Lady Ashtown.'

Mr. F. Brazier, Caterham: hardy flowers.

Croydon and District Mutual Improvement Society: American branching Asters.

Messrs. Dickson & Robinson, Manchester: Dahlias.

Miss Greaves, Reigate: Dahlias.

Guildford Hardy Plant Nursery: hardy plants.

Messrs. Harkness, Hitchen: Gladioli.

Miss Hopkins, Shepperton: alpines.

Mr. W. Leggett, Colchester: Roses.

Messrs. Peed, Streatham: alpines, &c.

Mr. A. Perry, Enfield: herbaceous plants.

Mr. A. H. Welham, Bridgnorth: Chrysanthemum 'A. Welham.'

Messrs. Wells, Merstham, Asters: Pentstemons, &c.

FLORAL COMMITTEE, SEPTEMBER 28, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and thirty-three members present.

Awards Recommended:—

Gold Medal.

To Messrs. J. Veitch, Chelsea, for ornamental vines.

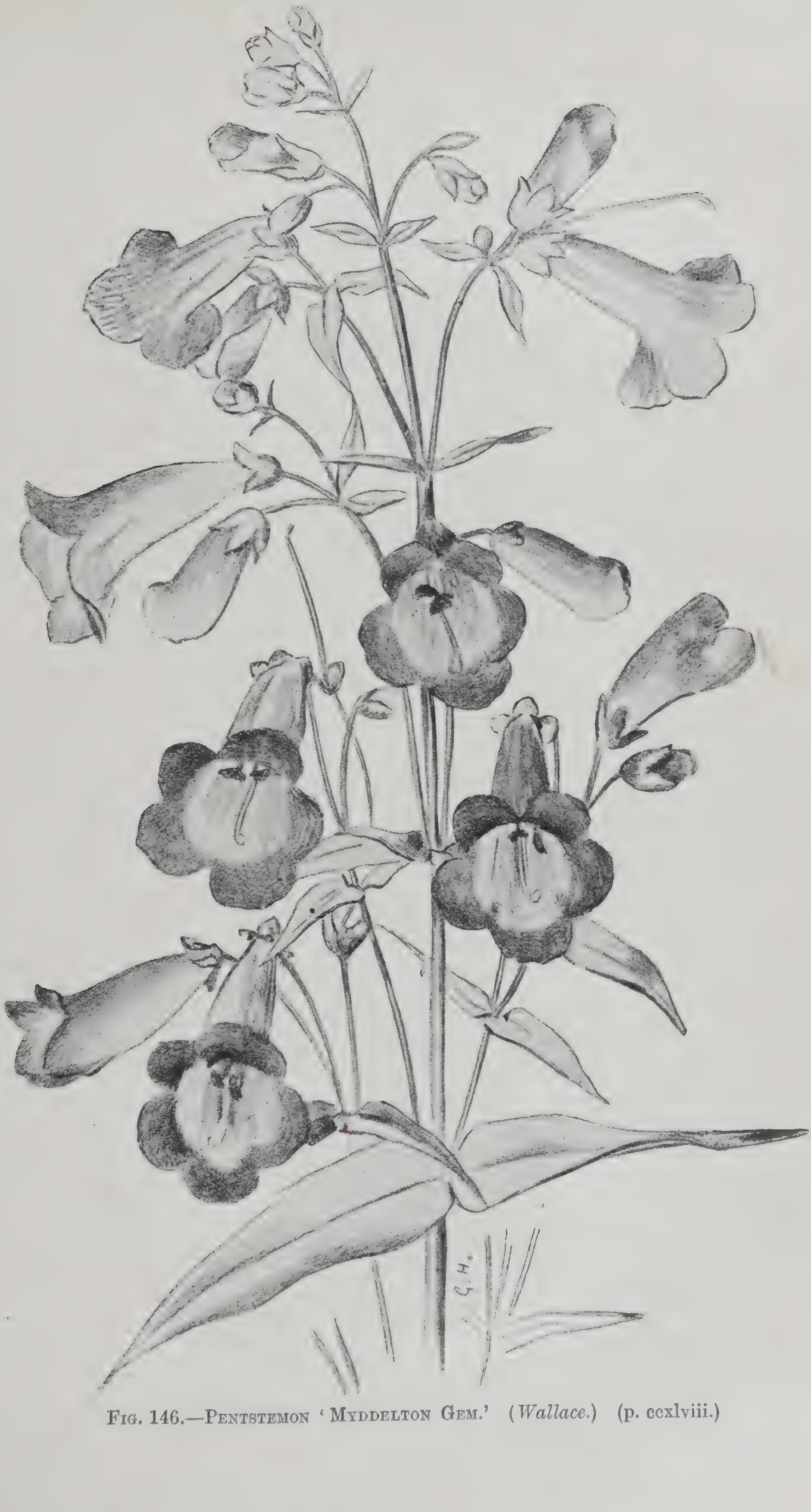


FIG. 146.—PENTSTEMON 'MYDDELTON GEM.' (*Wallace.*) (p. ccxlviii.)

Silver-gilt Flora Medal.

To Messrs. F. Cant, Colchester, for Roses.
To Messrs. G. Paul, Cheshunt, for Shrubs.
To Messrs. W. Paul, Waltham Cross, for Roses.

Silver-gilt Banksian Medal.

To Messrs. J. Burrell, Cambridge, for Roses and Gladioli.
To Mr. W. Treseder, Cardiff, for Dahlias and Roses.

Silver Flora Medal.

To Messrs. Carter Page, London Wall, E.C., for Dahlias.
To Messrs. Cutbush, Highgate, for Asters, Carnations, &c.
To Messrs. Dobbie, Rothesay, for Chrysanthemums.
To Messrs. Jones, Lewisham, S.E., for herbaceous plants.
To Messrs. May, Edmonton, for hardy ferns, &c.
To Mr. Seale, 24 London Road, Sevenoaks, for Dahlias.
To Mr. C. Turner, Slough, for Pompon Dahlias.
To Messrs. McGredy, Portadown, for Roses.

Silver Banksian Medal.

To Messrs. B. Cant, Colchester, for Roses.
To Messrs. J. Cheal, Crawley, for Dahlias.
To Messrs. Gunn, Birmingham, for Violas.
To Mr. L. R. Russell, Richmond, for Clematis.
To Messrs. Wells, Merstham, for Chrysanthemums.
To Mr. J. T. West, Brentwood, for Dahlias.

Bronze Flora Medal.

To Messrs. Ware, Feltham, for Dahlias, &c.
To Messrs. Clark, Dover, for herbaceous plants.
To Messrs. Stredwick, St. Leonards, for Dahlias.

Award of Merit.

To Carnation 'O. P. Basset' (votes, 14 for), from Mr. A. F. Dutton, Iver, Bucks. Flowers medium-sized; petals broad, serrated at the edges, rich bright scarlet; calyx non-splitting; stems rigid. A tree variety with a strong clove scent.

To *Pentstemon* 'Myddelton Gem' (votes, 10 for, 5 against), from Messrs. Wallace, Colchester. Plant 18 inches high, well branched; flowers very freely produced, rosy-scarlet with well-defined white throat. Although the flowers are small the plant is valuable on account of its quite hardy character. (Fig. 146.)

To Rambler Rose 'Flower of Fairfield' (votes, 12 for, 6 against), from Messrs. S. Low, Enfield. Similar to 'Crimson Rambler,' but a perpetual bloomer. (Fig. 147.)

To *Vitis Wilsonae* (votes, unanimous), from Messrs. J. Veitch, Chelsea. A new species from China. Leaves 6 inches long, cordate, with from 3 to 5 angles, sub-dentate, deep green above, pubescent on veins below; petiole pubescent. The leaves assume a rich red colour late in autumn, as was shown by the lower ones on the specimen exhibited.

The Dahlias on this occasion were judged by a joint Committee of the R.H.S. and the Dahlia Society.

To Dahlia 'Gold Crest' (votes, unanimous), from Messrs. Stredwick, St. Leonards. A bright fiery-red 'Cactus' variety, heavily tinged at base of florets with yellow.

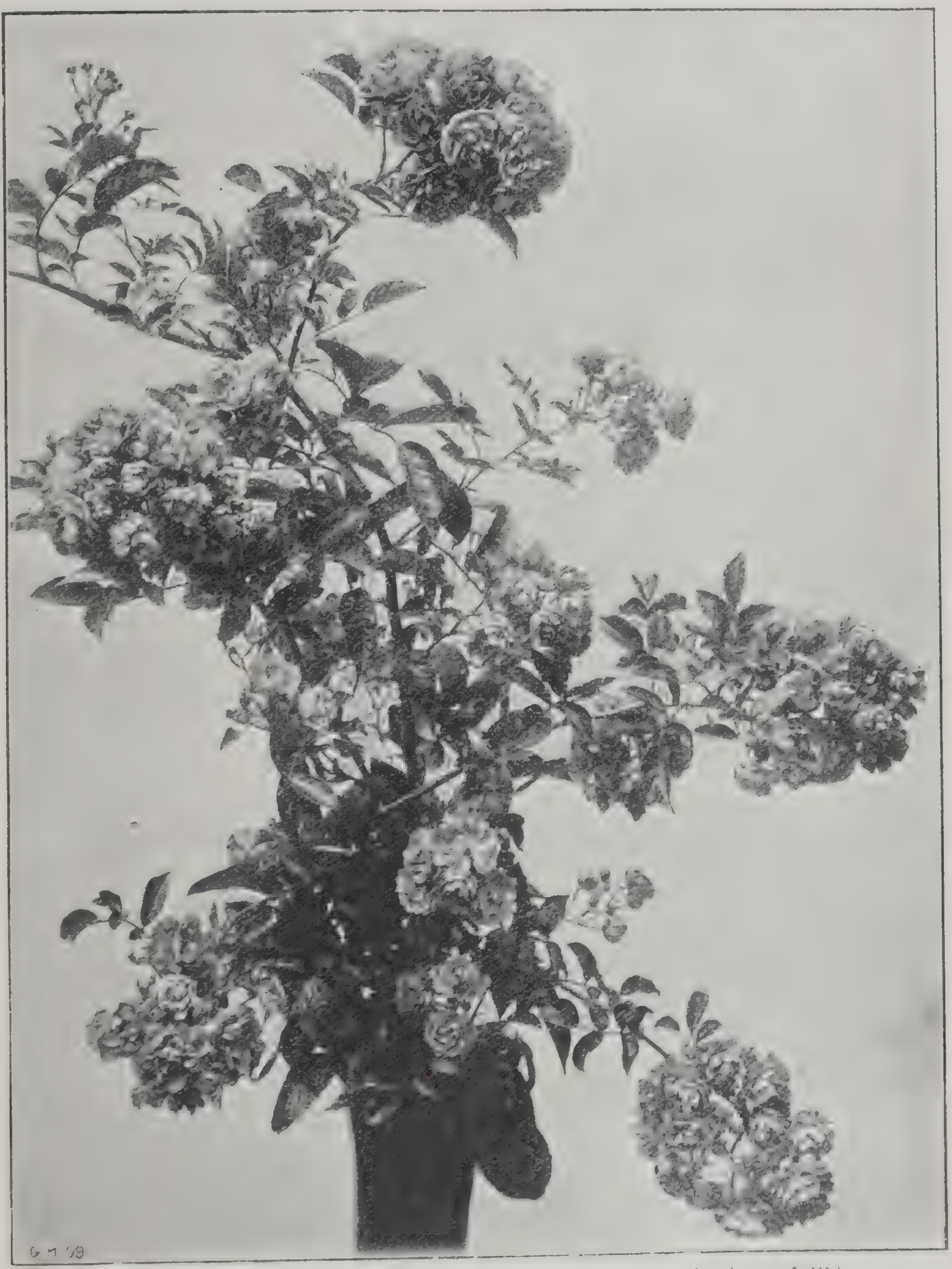


FIG. 147.—ROSE 'FLOWER OF FAIRFIELD.' (*Stuart Low.*) (p. ccxlviii.)

To Dahlia 'Little Donald' (votes, unanimous), from Mr. Mortimer, Rowledge, near Farnham. A 'Pompon' variety of excellent form, and of a deep crimson-maroon colour.

To Dahlia 'Quimbo' (votes, unanimous), from Messrs. Stredwick, St. Leonards. A 'Cactus' variety of excellent form; florets much curved, very narrow, crimson, deeper towards centre, and tinged rose at tips of outer florets.

To Dahlia 'The Lancer' (votes, unanimous), from Mr. H. Shoesmith, Woking. A flat 'Cactus' variety, florets only slightly curved, bright scarlet, tinged apricot at base.

Mr. Hudson, V.M.H., proposed, and Rev. Page Roberts seconded, that all Roses presented before the Floral Committee be shown as grown, and not dressed. The Resolution was carried.

Cultural Commendation.

To Miss S. G. Abethall, Muswell Hill, N., for *Platycerium alcicorne.*

Other Exhibits.

Messrs. Backhouse, York: Colchicums.
Messrs. Barr, Covent Garden: herbaceous plants.
Mr. F. Brazier, Caterham: Phloxes, Asters, &c.
Lady Blois, Loxford: Carnations.
Rev. L. C. Chalmers-Hunt, Hitchin: Roses and Sweet Peas.
Mr. C. Elliott, Stevenage: herbaceous plants.
Misses Hopkins, Shepperton: herbaceous plants.
Mr. G. Lange, Hampton: Carnations.
Mr. W. Leggett, Colchester: Roses.
Messrs. Looymans & Zonen, Oudenbosch, Holland: Roses.
Messrs. Peed, Streatham: Carnations.
Mr. G. Reuthe, Keston: herbaceous plants.

Floral Committee, October 12, 1909.

Mr. W. Marshall, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended:—

Gold Medal.

To Mr. L. R. Russell, Richmond, for Ivies and Bertolonias.
To Messrs. Veitch, Chelsea, for Nepenthes, &c.

Silver-gilt Flora Medal.

To Lady Tate, Streatham Common, for Ferns.

Silver-gilt Banksian Medal.

To Messrs. Carter Page, London Wall, E.C., for Dahlias.
To Messrs. Cheal, Crawley, for Dahlias and Asters.
To Messrs. T. S. Ware, Feltham, for Begonias, &c.

Silver Flora Medal.

To Messrs. May, Edmonton, for hardy ferns.
To Messrs. Cutbush, Highgate, for cut flowers.

To Messrs. Jones, Lewisham, for Asters.
To Messrs. F. Cant, Colchester, for Roses.

Silver Banksian Medal.

To Messrs. R. Harkness, Hitchin, for Roses.
To Messrs. D. Russell, Brentwood, for Conifers.

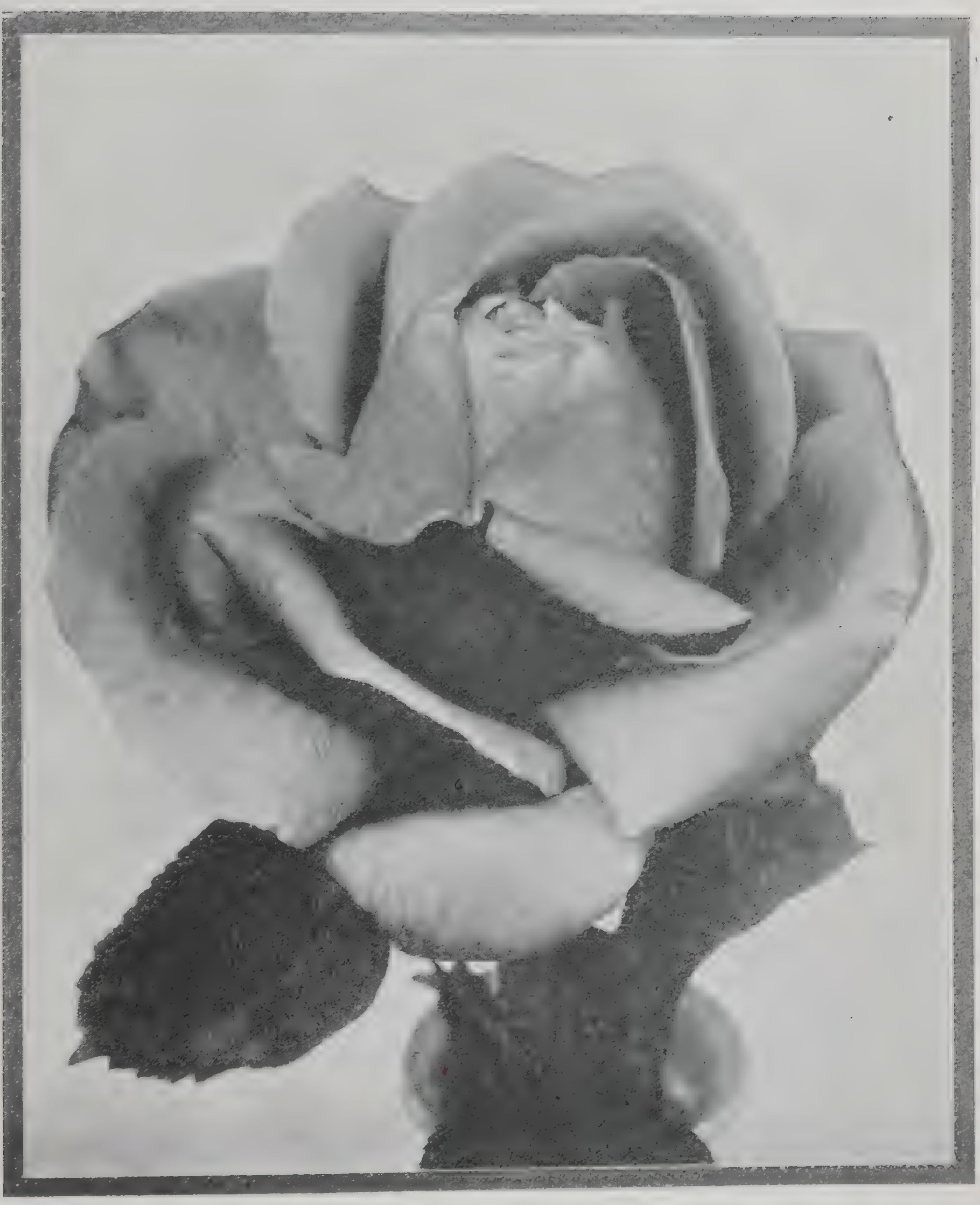


Fig. 148.—H.T. Rose 'Claudius.' (*Benj. Cant.*) (p. cclii.)

Bronze Flora Medal.

To Mr. C. Turner, Slough, for hardy flowers.
To Mr. C. Elliott, Stevenage, for Asters.
To Messrs. Clark, Dover, for herbaceous plants.
To Mr. F. Brazier, Caterham, for herbaceous plants.

To Messrs. Bunyard, Maidstone, for Asters.
To Messrs. W. Wells, Merstham, for Chrysanthemums and Asters.

Bronze Banksian Medal.

To Misses Hopkins, Shepperton, for Asters.
To Messrs. Gunn, Birmingham, for *Viola cornuta.*
To Messrs. Barr, Covent Garden, for herbaceous plants.
To Messrs. Notcutt, Woodbridge, for Asters.

Award of Merit.

To Aster 'Lustre' (votes, 14 for, 5 against), from Hon. Vicary Gibbs, Elstree. A semi-double variety of the *Novae-Belgii* section, with mauve flowers 1¼ inch in diameter. 4 feet.

To Chrysanthemum 'Mary Farnsworth' (votes, 15 for), from Messrs. Stredwick, St. Leonards. A Japanese variety, with broad reflexed florets, buff, tinged with rose. Flowers of good depth and substance.

To Chrysanthemum 'White Queen' (votes, 20 for), from Mr. M. Silsbury, Shanklin, Isle of Wight. Reflexed Japanese variety, with fairly wide, pure white florets.

To Rose 'Claudius' (votes, unanimous), from Messrs. B. Cant, Colchester. A deep rose, H.T. variety, very sweet-scented, and flowers borne on good stiff stems. (Fig. 148.)

To *Streptocarpus* (votes, unanimous), from Hon. V. Gibbs, Elstree. Flowers large, of good form; colours many and varied, including some very pleasing tints. The award was to the strain.

To *Myrsiphyllum asparagoides aureum* (votes, 12 for, 7 against), from Messrs. Rochford, Broxbourne.

Other Exhibits.

Misses Allen Brown, Henfield: Violets.
Mr. G. D. Davidson, Norwich: Asters.
Mr. W. H. Lancashire, Guernsey: Carnations.
Mr. W. Leggett, Colchester: Roses.
Messrs. Low, Enfield: Carnations.
Mr. J. T. West, Brentwood: Dahlias.

FLORAL COMMITTEE, OCTOBER 26, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-six members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Hon. V. Gibbs, Elstree, for Asters.
To Messrs. Hill, Edmonton, for Gleichenias.
To Messrs. Veitch, Chelsea, for Begonias.

Silver-gilt Banksian Medal.

To Messrs. Wells, Merstham, for Chrysanthemums.

Silver Flora Medal.

To Mr. F. Brazier, Caterham, for hardy plants, &c.
To Messrs. Cutbush, Highgate, for Carnations, &c.
To Messrs. Jones, Lewisham, for Asters and Chrysanthemums.

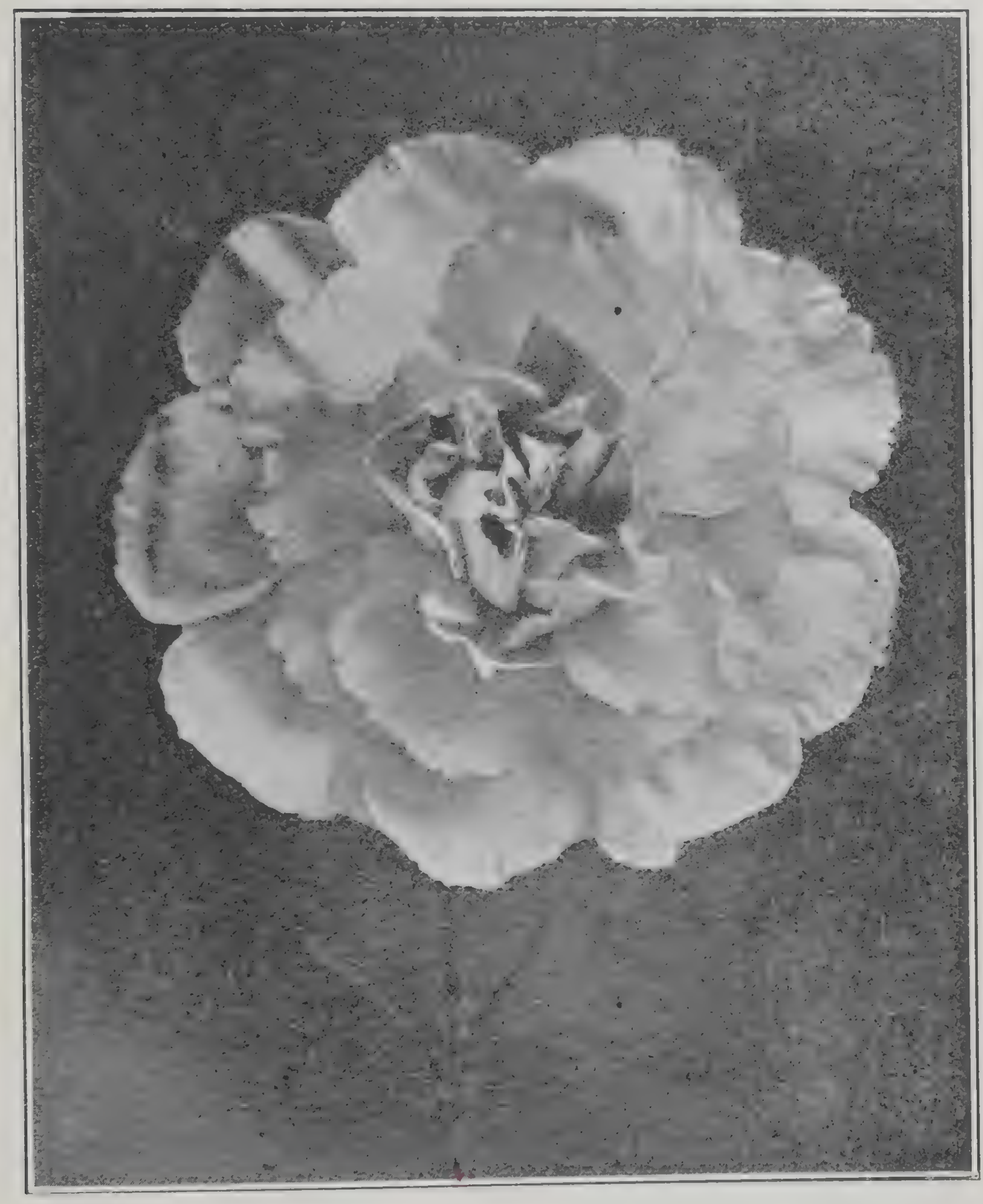


Fig. 149.—Carnation 'May Day.' (*Stuart Low.*) (p. cclv.)

To Messrs. May, Edmonton, for Blechnums, &c.
To Messrs. Ware, Feltham, for Begonias.

Silver Banksian Medal.

To Messrs. Bakers, Codsall, for Dahlias.
To Messrs. Carter Page, London Wall, E.C., for Chrysanthemums.
To Messrs. Cheal, Crawley, for Dahlias, &c.

To Messrs. Gunn, Birmingham, for Chrysanthemums.
To Messrs. D. Russell, Brentwood, for shrubs.
To Mr. L. R. Russell, Richmond, for shrubs.

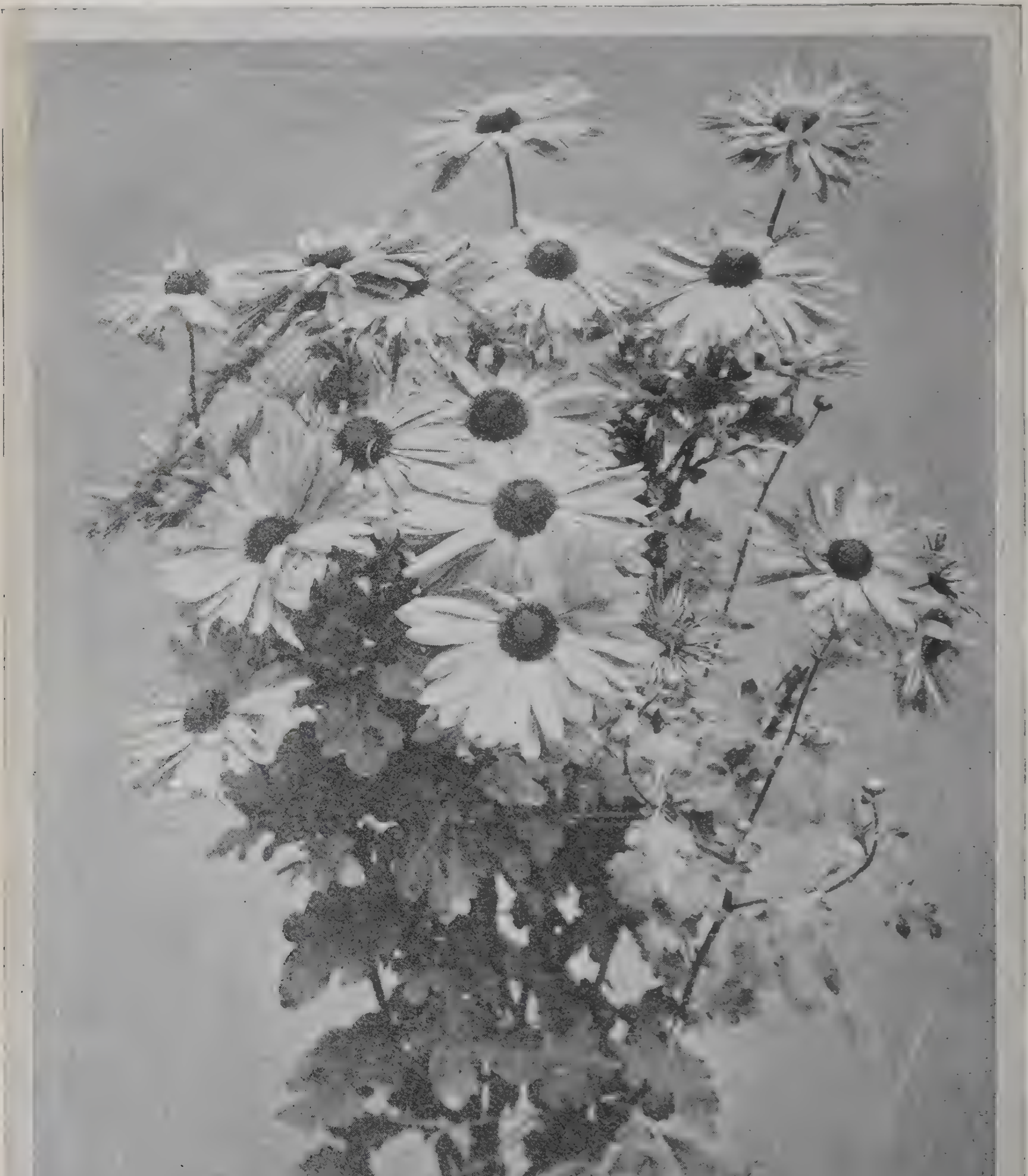


Fig. 150.—Chrysanthemum 'Altrincham Yellow.' (*From Gardeners' Magazine.*) (p. cclv.)

Award of Merit.

To Aster 'Bianca' (votes, 11 for, 3 against), from Hon. V. Gibbs, Elstree (gr. Mr. E. Beckett). Inflorescence 4 feet high; branchlets spreading horizontally; flowers white, ½ inch in diameter; disc small.

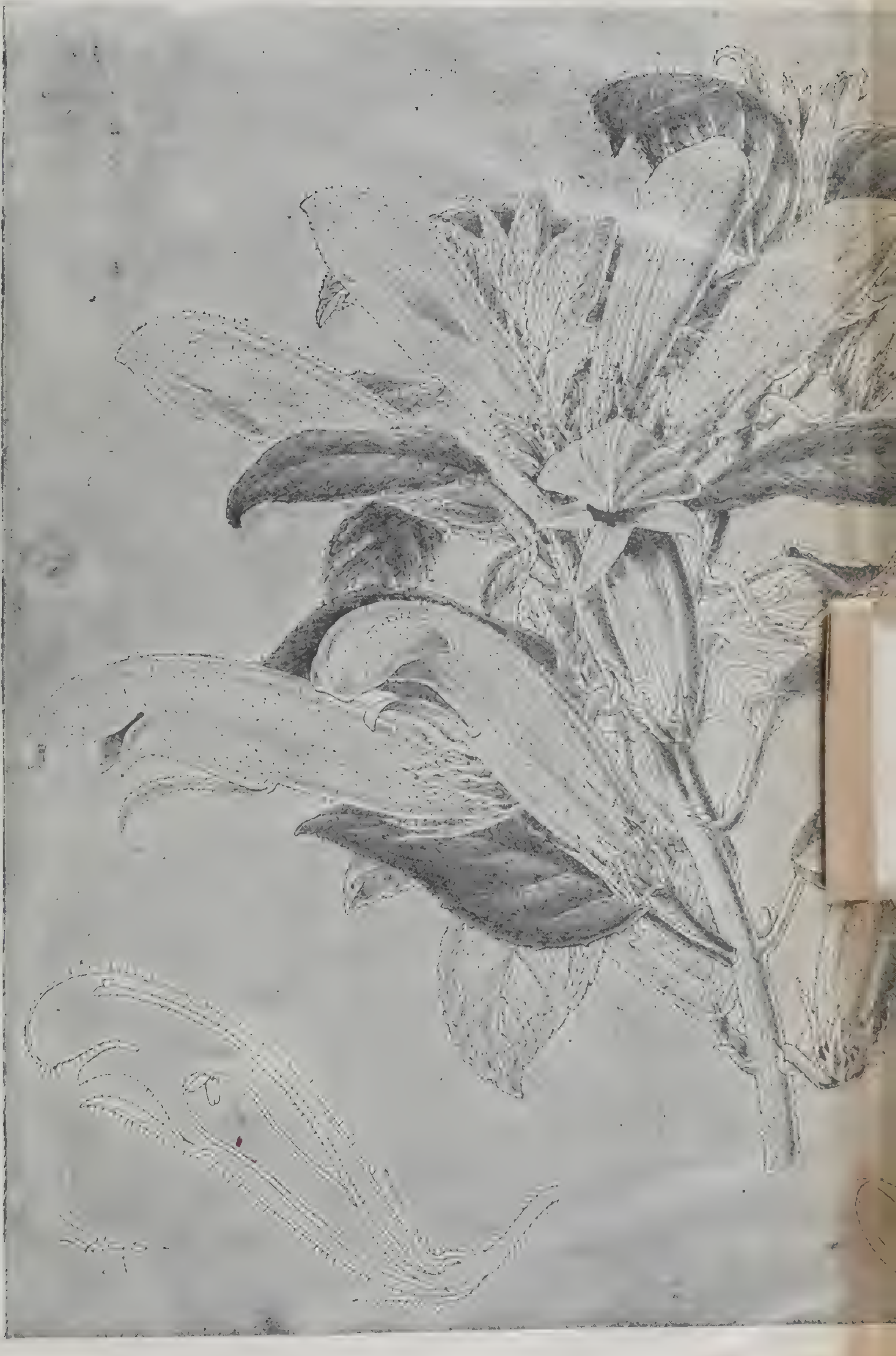


Fig. 151.- Columnea magnifica. (*Gardeners' Chronicle.*

To Carnation 'May Day' (votes, 17 for, 1 against), from Messrs. Bath, Wisbech, Messrs. Low, Enfield, and Messrs. Peed, Streatham. Medium-sized flowers, with broad, shapely petals, very slightly serrated at the edges; pink; calyx good; very free-flowering, and slightly clove-scented. (Fig. 149.)

To Chrysanthemum 'Altrincham Yellow' (votes, unanimous), from Messrs. Wells, Merstham. A rich chrome-yellow single variety, with flowers 4 inches in diameter, freely produced; disc large, green at first, but changing to rich yellow. (Fig. 150.)

To Chrysanthemum 'Mrs. R. Luxford' (votes, 12 for, 5 against), from Messrs. W. Wells, Merstham. A Japanese variety; florets broad, Indian red, with old gold reverse; flowers deep, and of good substance.

To Chrysanthemum 'Mrs. Thornton' (votes, 10 for), from Mr. H. Perkins, Henley. A large Japanese variety, with full, well-formed flowers; white; upper florets tinged with yellow, the lower with pale rosy-purple.

To *Columnea magnifica* (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., Dorking (gr. Mr. Bain). This beautiful species is a native of Central America. Corolla tubular, 3 inches long, orange, 2-lipped, lower lip 3-fid, pubescent; leaves opposite, decussate, serrate. Requires an intermediate house. (Fig. 151.)

Other Exhibits.

Messrs. Barr, Covent Garden: alpines, &c.
Messrs. Cannell, Swanley: Begonias.
Mr. A. W. Gwillim, New Eltham: Begonias.
Misses Hopkins, Shepperton: alpines.
Mr. W. Leggett, Colchester: Roses.
Mrs. Stewart Mackenzie, Haywards Heath: Begonias.
F. Mocatta, Esq., Addlestone: Chrysanthemums.
Lady de Ramsay, Norwich: Begonias.
Mr. G. Reuthe, Keston: Nerines, &c.
Mr. M. Silsbury, Shanklin: Chrysanthemums.
F. C. Stoop, Esq., Byfleet: Chrysanthemums.
Mr. F. Wyatt, Walthamstow: Dahlias.

FLORAL COMMITTEE, NOVEMBER 9, 1909.

Mr. W. MARSHALL, V.M.H., in the Chair, and twenty-seven members present.

Awards Recommended:—

Gold Medal.

To Messrs. Hill, Lower Edmonton, for a group of stove and greenhouse ferns.

Silver-gilt Flora Medal.

To Messrs. May, Edmonton, for ferns, &c.

To Messrs. Veitch, Chelsea, for stove-plants and Chrysanthemums.

Silver-gilt Banksian Medal.

To E. H. Brown, Esq., Roehampton, for foliage plants.
To Baron Schröder, Englefield Green, for Begonias.

Silver Flora Medal.

To Mr. W. H. Page, Hampton, for Carnations.

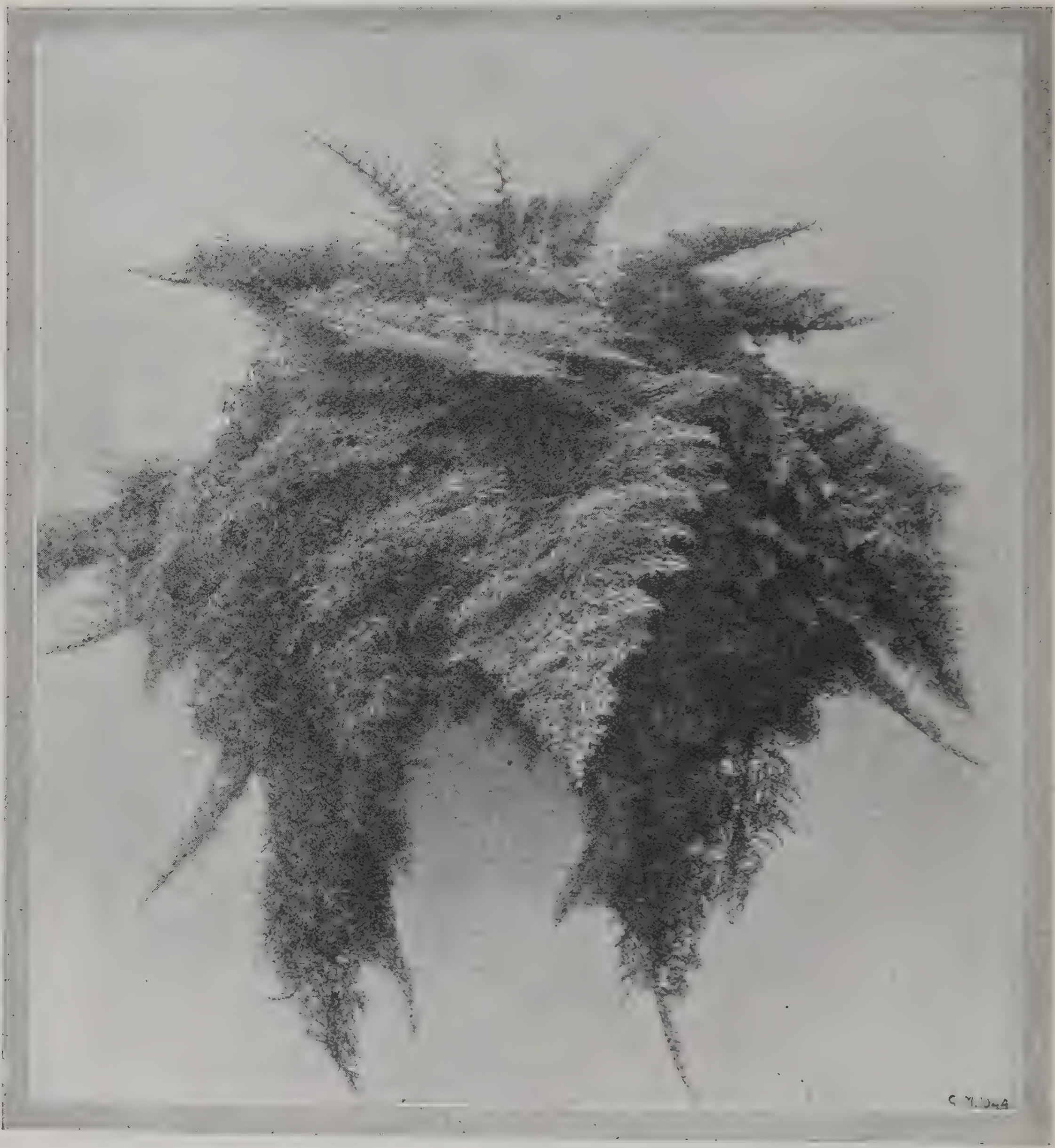


FIG. 152.—NEPHROLEPIS EXALTATA VAR. MARSHALLII. (*May.*) (p. cclvii.)

Silver Banksian Medal.

To Messrs. Cutbush, Highgate, for Carnations.
To Lord Hillingdon, Uxbridge, for Carnations.

Bronze Flora Medal.

To Messrs. Cannell, Swanley, for Chrysanthemums.
To the Duchess of Bedford, Rickmansworth, for Gesneras.
To Sir D. Gooch, Bart., Chelmsford, for Chrysanthemums.

First-class Certificate.

To *Nephrolepis exaltata* var. *Marshallii* (votes, unanimous), from Messrs. May, Edmonton. Fronds densely plumose, very wide, of very fine texture, hanging down so as to hide the pot. A sport from *N. exaltata* var. *Amerpohlii.* (Fig. 152.)

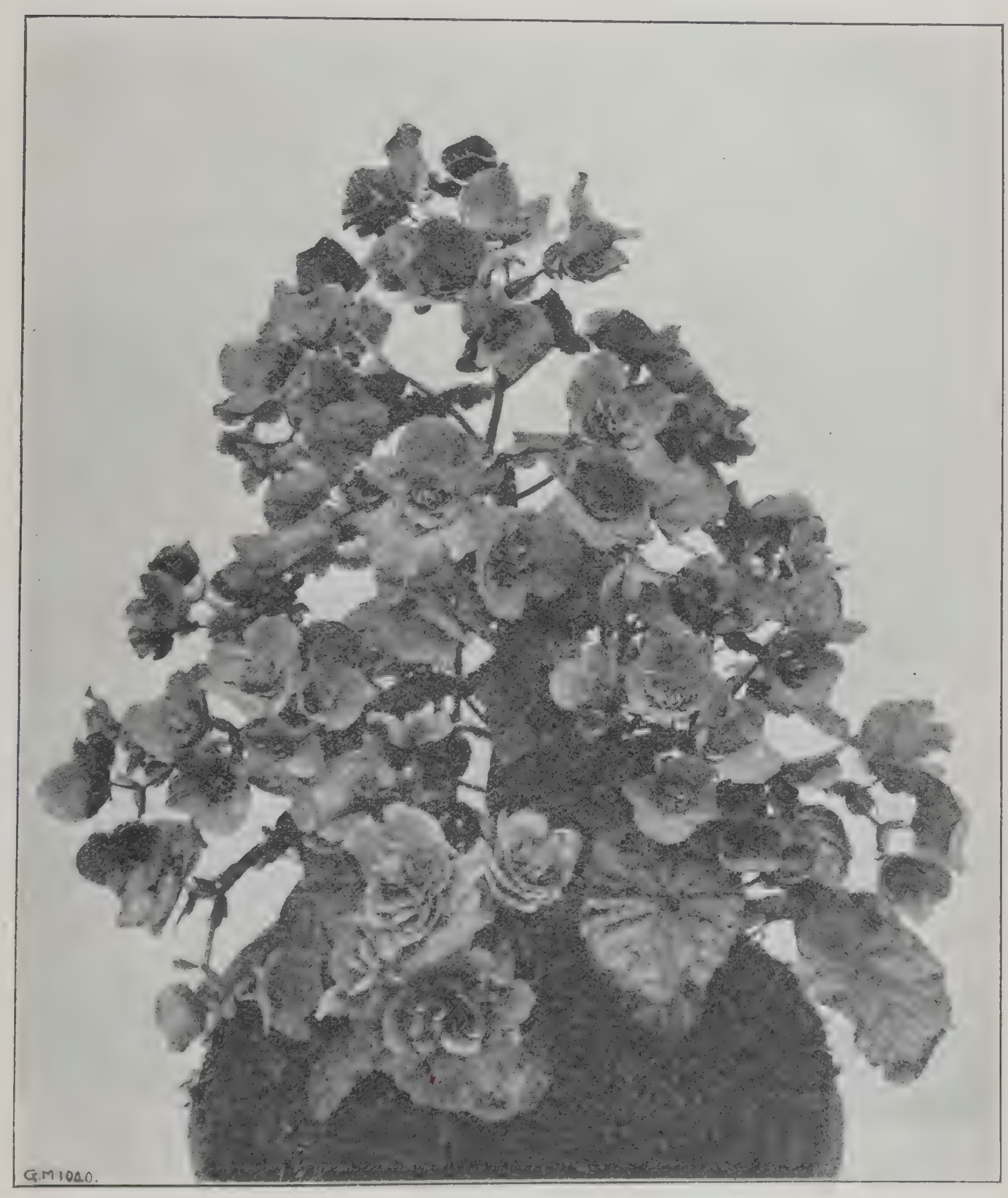


Fig. 153.—Begonia 'The Gem.' (*J. Veitch.*)

Award of Merit.

To *Begonia* 'The Gem' (votes, unanimous), from Messrs. J. Veitch, Chelsea. The result of crossing *B. socotrana* with a variety of the tuberous section. Flowers semi-double, rich carmine; habit erect, vigorous. Flowers freely produced and very slow to fade. (Fig. 153.)

To Chrysanthemum 'Lingwood's Pride' (votes, 20 for, 1 against), from Messrs. J. Peed, Norwood. Flowers 5 inches in diameter, borne on stout stems; florets quilled, pink, of good substance. A single variety.

Other Exhibits.

R. Barclay, Esq., Dorking: Chrysanthemums.
Messrs. Barr, Covent Garden: Crocuses, &c.
J. B. Hankey, Esq., Leatherhead: Chrysanthemums.
Misses Hopkins, Shepperton: Alpines.
Messrs. Low, Enfield: Carnations.
Mr. L. R. Russell, Richmond: shrubs.
Mr. M. Silsbury, Shanklin: Chrysanthemums.
F. C. Stoop, Esq., Byfleet: Chrysanthemums.
Mr. W. E. Wallace, Dunstable: Carnations.
Lady Walsingham, St. Lawrence, Isle of Wight: *Nerine flexuosa alba*, grown in open air.
Messrs. Wells, Merstham: Chrysanthemums.
M. S. Williams, Esq., Llantwit Major: Chrysanthemums.

Floral Committee, November 23, 1909.

Mr. W. Marshall, V.M.H., in the Chair, and twenty-three members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Jones, Lewisham, for Chrysanthemums.

To Messrs. J. Veitch, Chelsea, for winter-flowering Begonias, and Chrysanthemums.

Silver Flora Medal.

To Messrs. Cutbush, Highgate, for Carnations.
To Messrs. May, Edmonton, for Ferns, &c.
To Mr. L. R. Russell, Richmond, for hardy shrubs.

Silver Banksian Medal.

To Messrs. Butler, Bexley Heath, Kent, for Chrysanthemums.
To Messrs. Cannell, Swanley, for Chrysanthemums.

Bronze Flora Medal.

To Mr. F. Brazier, Caterham, for Chrysanthemums.
To Mr. F. Lilley, Guernsey, for Chrysanthemums.
To Messrs. S. Low, Enfield, for Carnations and Begonias.
To Messrs. G. Williams, Cardiff, for single Chrysanthemums.

To Messrs. W. Wells, Merstham, for Chrysanthemums.

To Mrs. Wythes, Epping (gr. Mr. Bullock), for winter-flowering Begonias.

Bronze Banksian Medal.

To J. A. Dunn, Esq., Kingston, for Begonias.

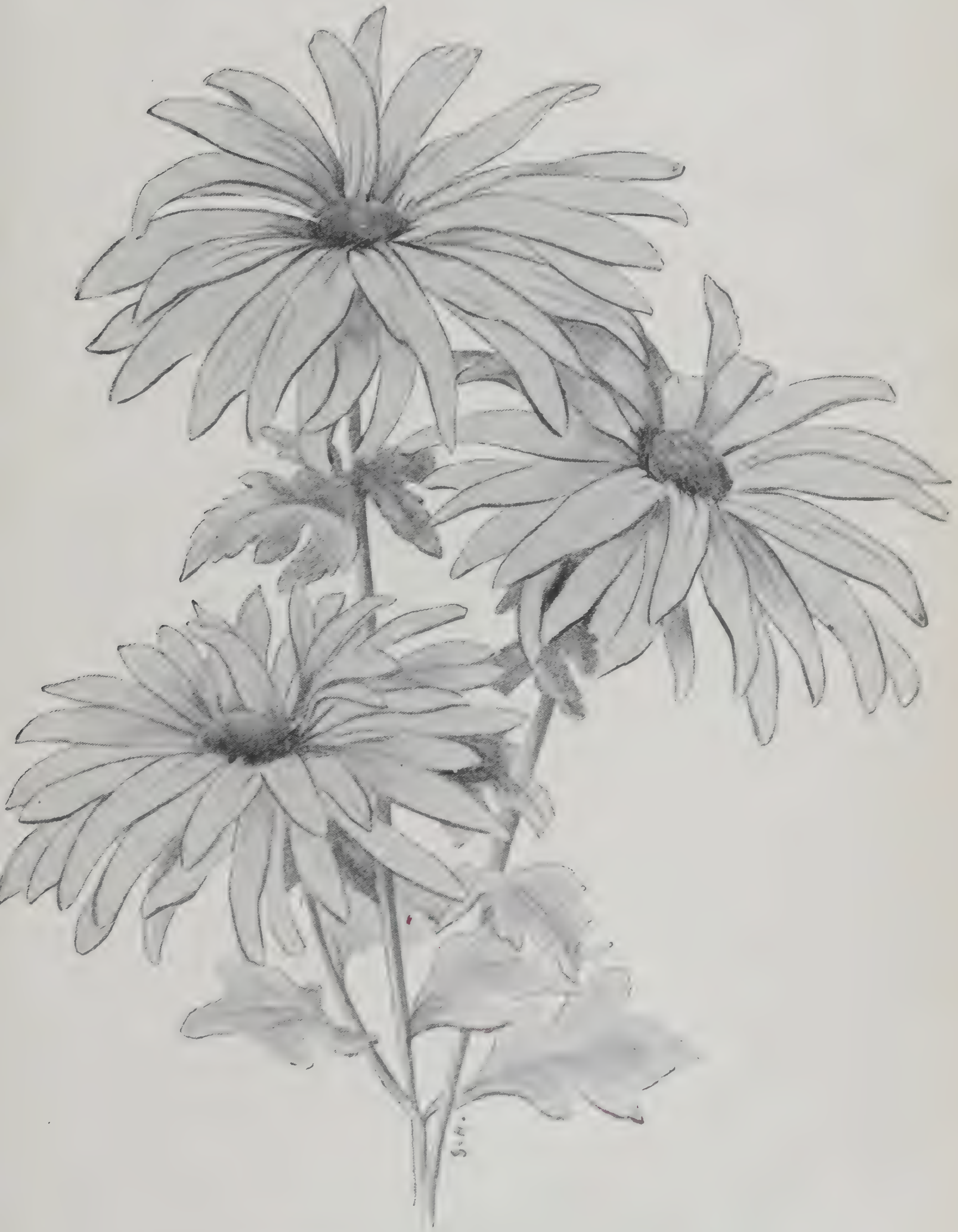


Fig. 154.—Chrysanthemum 'J. B. Lowe.' (*The Garden.*) (p. cclx]

Award of Merit.

To Chrysanthemum 'J. B. Lowe' (votes, unanimous), from Messrs. Jones, Lewisham. A single variety, with large flowers of a brilliant crimson; florets broad, pointed, curled at the tips; produces large flowers in abundance, on long rigid stems. (Fig. 154.)

To Chrysanthemum 'Mensa' (votes, unanimous), from Messrs. Jones. Flowers large, of fine form, the florets being arranged in a perfect circle, and very flat and broad. Pure white.

To Chrysanthemum 'Miss Lilian Bullivant' (votes, unanimous), from Mrs. Bullivant, Beckenham. A small, free-flowering, single variety, of a pale creamy-yellow.

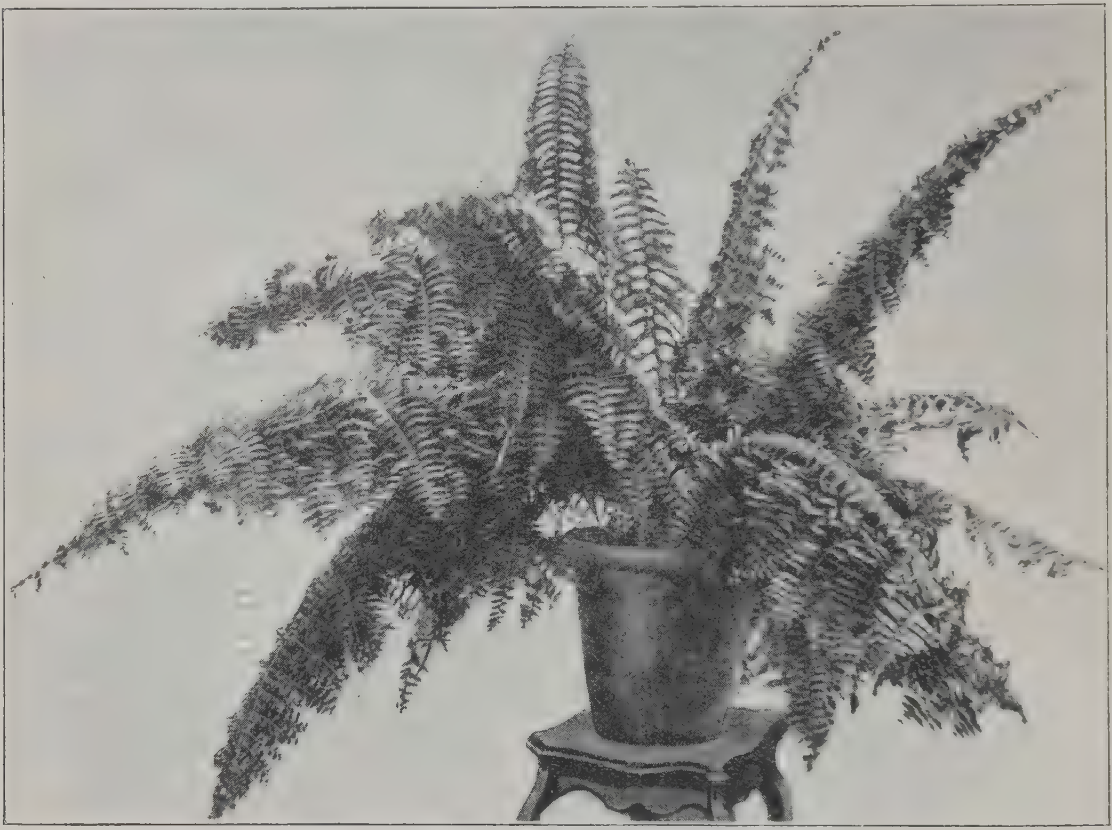


FIG. 155.—NEPHROLEPIS SPLENDENS. (*May.*)

To Chrysanthemum 'Mrs. W. Buckingham' (votes, unanimous), from Mr. L. R. Russell, Richmond. A single variety, with large, well-formed flowers, of a soft pink colour. The stems are very rigid.

To *Nephrolepis splendens* (votes, 14 for, 1 against), from Messrs. May, Edmonton. Said to be the result of crossing two garden forms—*N. Bausei* and *N. recurvata*. The pinnae fall away from the rachis, as in the latter, but have the fringed character of the former parent. (Fig. 155.)

To *Pelargonium* 'His Majesty' (votes, unanimous), from Mr. W. H. Page, Hampton. Flowers very large, rich scarlet, with a conspicuous white eye. The trusses are large, and very freely produced on plants of compact growth.

Other Exhibits.

R. Barclay, Esq., Dorking: Chrysanthemums.

Messrs. Bath, Wisbech: Chrysanthemums.

Mrs. Chappell, Warwick: Chrysanthemums.
Messrs. Cuthbert, Southgate: Hyacinths.
Mr. A. F. Dutton, Iver: Carnations.
Mr. H. Fritie, Worcester: Chrysanthemums.
Mrs. R. Gregory, Shoreham: Chrysanthemums.
Misses Hopkins, Shepperton: alpines.
Mr. N. Molyneux, Wickham: Chrysanthemums.
M. Nicholls Esq., Sevenoaks: Chrysanthemums.
Messrs. Peed, W. Norwood: alpines, &c.
Messrs. Sutton, Reading: *Primula obconica.*

FLORAL COMMITTEE, DECEMBER 7, 1909.

Mr. H. B. MAY in the Chair, and twenty-two members present.

Awards Recommended:—

Silver-gilt Banksian Medal.

To Mr. H. Burnett, Guernsey, for Carnations.
To Mr. W. H. Page, Hampton, for Carnations and Lilies.
To Messrs. J. Veitch, Chelsea, for winter-flowering Begonias.

Silver Flora Medal.

To E. H. Brown, Esq. (gr. Mr. Bradford), Roehampton, for Begonias, Poinsettias, &c.
To Messrs. Cutbush, Highgate, for Carnations and shrubs.
To Messrs. May, Edmonton, for Ferns, &c.
To the Rev. H. Buckston, (gr. Mr. Shambrook), Etwall, Derby, for Cyclamen.

Silver Banksian Medal.

To W. Astor, Esq. (gr. Mr. Camm), Taplow, for Cyclamen.
To Messrs. Cannell, Swanley, for Pelargoniums and Chrysanthemums.
To Messrs. Low, Enfield, for Carnations.

Award of Merit.

To Chrysanthemum 'Kathleen May' (votes, unanimous), from Messrs. Jones, Lewisham. A decorative anemone-flowered variety. Ray florets broad, flat, rich bright crimson, with scarlet shadings; disc very full, bright yellow. Undisbudded sprays were shown, and from these it was evident that the variety is very free-flowering.

To Chrysanthemum 'Mrs. W. Parker' (votes, 9 for, 1 against), from Mr. F. Brazier, Caterham. A free-flowering single variety; flowers pale pink, produced in large sprays 3 feet high, with rigid stems.

Other Exhibits.

Mr. J. Agate, Havant: Chrysanthemums.
Mr. W. J. Barnes, Windsor: Chrysanthemums.
Mr. F. Brazier, Caterham: Chrysanthemums.
Messrs. Chatfield, Southwick: Chrysanthemums.

Mr. J. Douglas, Gt. Bookham: Carnation 'Hercules,' (as a winter-flowering variety).

Misses Hopkins, Shepperton: alpines.

Messrs. J. Peed, Streatham: alpines, &c.

Mr. L. R. Russell, Richmond: Ivies.

Baron Bruno Schröder, Heath Lodge, Englefield Green: Chrysanthemums.

Messrs. Wells, Merstham: Chrysanthemums.

F. W. G. Williams, Esq., Bromyard: Chrysanthemums.

FLORAL COMMITTEE, DECEMBER 21, 1909.

Mr. H. B. MAY in the Chair, and fourteen members present.

There was no business before the Committee.

ORCHID COMMITTEE.

SEPTEMBR 14, 1909.

Mr. J. GURNEY FOWLER in the Chair, and eighteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Sander, St. Albans, for hybrids and rare species.
To Messrs. Charlesworth, Haywards Heath, for a group.
To Messrs. Stuart Low, Bush Hill Park, for a group.

Silver Banksian Medal.

To Mr. E. V. Low, for a small group.
To Messrs. McBean, Cooksbridge, for a group.

Award of Merit.

To *Cattleya* × *iridescens splendens* (*bicolor* × *Eldorado*) (votes, 14 for, 2 against), from Messrs. Stanley, Southgate. In form resembling *C.* × *Iris.* Cream-white, slightly tinged with rose, and having the middle portion of the lip bright orange, and the front lobe mottled with purple.

Botanical Certificate.

To *Angraecum stylosum*, from Sir Trevor Lawrence, Bart., K.C.V.O. (gr. Mr. W. H. White.) Allied to *A. articulatum* and *A. Ellisii.* Flowers in pendulous racemes, white with the filiform spurs greenish, slightly tinged with brown.

Cultural Commendation.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., for *Angraecum Kotschyi*, with eight spikes, the longest bearing fifteen flowers. (Fig. 156.)

To Mr. Collier, gr. to Sir Jeremiah Colman, Bart., for *Angraecum Eichlerianum* with thirteen flowers.

Other Exhibits.

Sir Jeremiah Colman, Bart., V.M.H.: white *Dendrobium Phalaenopsis.*

R. G. Thwaites, Esq.: hybrid orchids.
Mr. H. A. Tracy: *Cirrhopetalum maculosum.*
J. Forster Alcock, Esq.: *Cypripedium* × *Wiertzianum.*
Messrs. William Bull: Cattleyas.

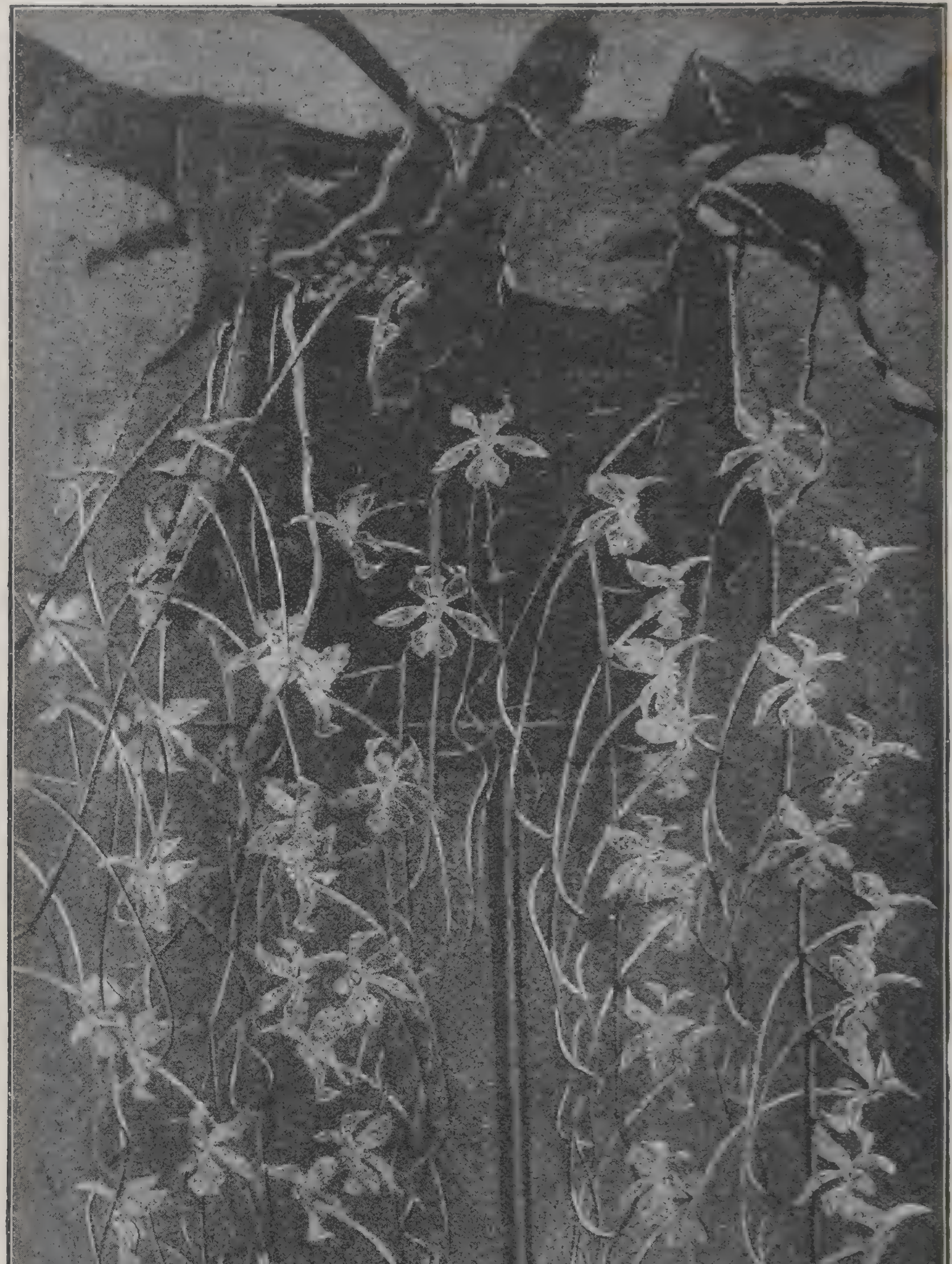


FIG. 156.—ANGRAECUM KOTSCHYI. (*Gardeners' Chronicle.*) (p. cclxiii.)

ORCHID COMMITTEE, SEPTEMBER, 28, 1909.

Mr. J. GURNEY FOWLER in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Flora Medal.

To Messrs. Sander, St. Albans, for a group.
To Messrs. Mansell and Hatcher, Rawdon, for a group.
To Messrs. Stuart Low, Bush Hill Park, for a group.

First-class Certificate.

To *Laeliocattleya* × 'Pizarro,' Holford's variety (*L. Jongheana* × *C. Dowiana aurea*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O., (gr. Mr. H. G. Alexander). Flowers large; sepals and petals bright purplish-rose; lip deep copper-red obscurely veined with gold.

Award of Merit.

To *Cattleya* × 'Rhoda' *conspicua* (× *Iris* × *Hardyana*) (votes, unanimous), from Messrs. Stuart Low, Bush Hill Park. Resembling a white *C.* × *Hardyana*. Sepals and petals cream-white, lip violet-crimson with yellow lines at the base.

To *Cattleya* × 'Mrs. Pitt' *superba* (*Harrisoniana* × *Dowiana aurea*). Differing from the original form in being of a deeper rose-pink and having a prismatic arrangement of purple lines in the tube of the lip.

Botanical Certificate.

To *Disa polygonoides*, from Messrs. Jas. Veitch. A remarkable species from S.E. Cape Colony. Leaves broad and thick. Inflorescence 2 feet, erect; bearing on the upper half a densely set spike of curious yellow flowers.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O.: *Cypripedium* × 'Actaeus Bianca,' and *Laeliocattleya* × 'Golden Fleece.'

Sir Jeremiah Colman, Bart., V.M.H.: group of rare orchids.

J. Gurney Fowler, Esq.: rare Cypripediums.

de B. Crawshay, Esq.: *Odontoglossum* × *Macnabianum rosefieldiense.*

H. S. Goodson, Esq.: *Cypripedium* × *Chapmanii.*

E. Rogerson, Esq., Manchester: *Odontoglossum crispum* 'Ethel.'

H. T. Pitt, Esq.: *Odontoglossum* × *stamfordianum* (*bictoniense album* × *Uro-Skinneri*).

Messrs. Stanley: hybrid Cattleyas.

Orchid Committee, October 12, 1909.

Mr. J. Gurney Fowler in the Chair, and twenty-three members present.

Awards Recommended :—

Silver Flora Medal.

To H. S. Goodson, Esq., Fairlawn, Putney (gr. Mr. G. E. Day), for Cattleyas, Odontoglossums, &c.

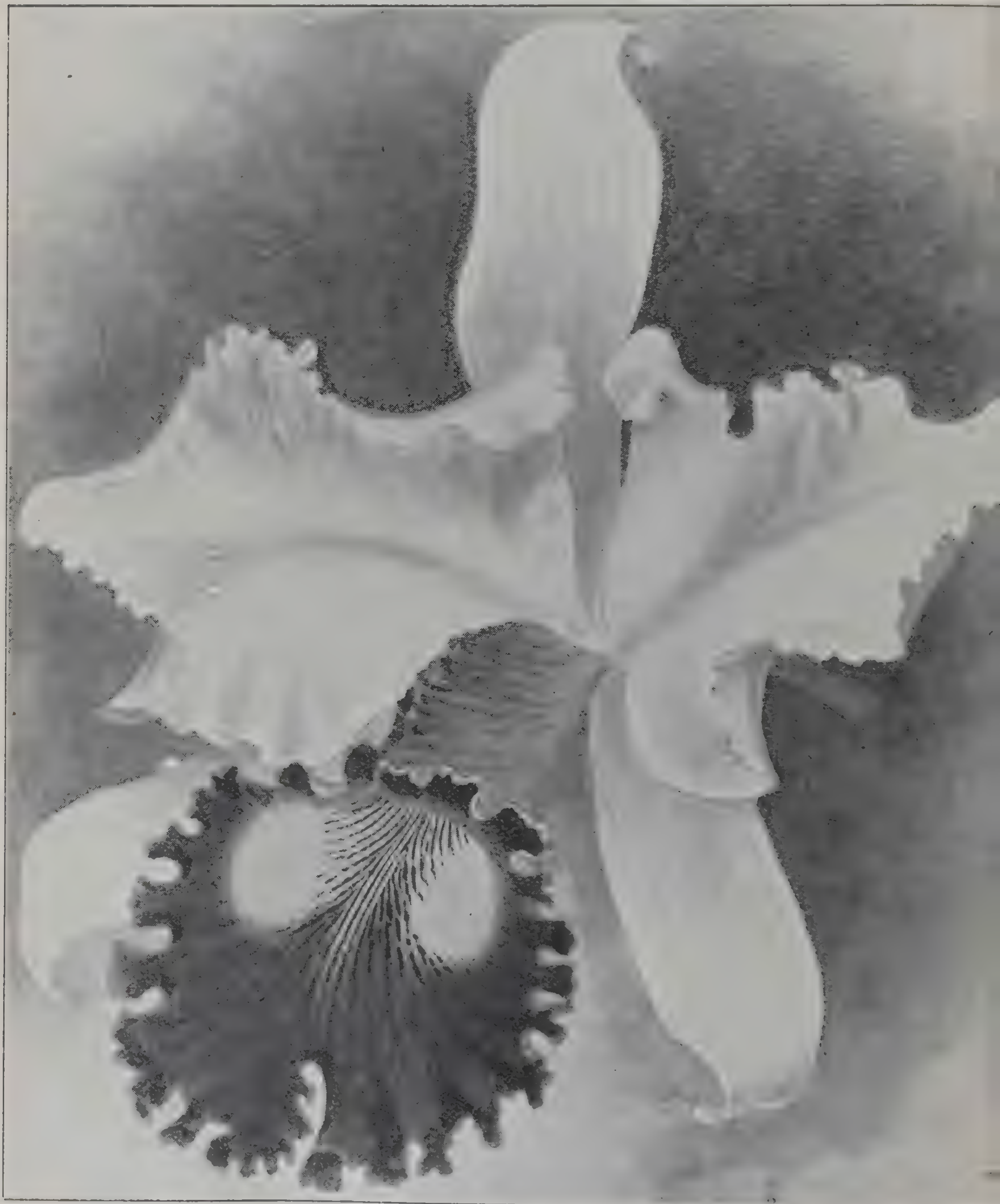


Fig. 157.—Cattleya × Hardyana 'The Baron.' (*Journal of Horticulture.*)
(p. cclxvii.

To Messrs. Charlesworth, Haywards Heath, for hybrids.
To Messrs. Sander, St. Albans, for a group.
To Messrs. Stuart Low, Bush Hill Park, for a group.

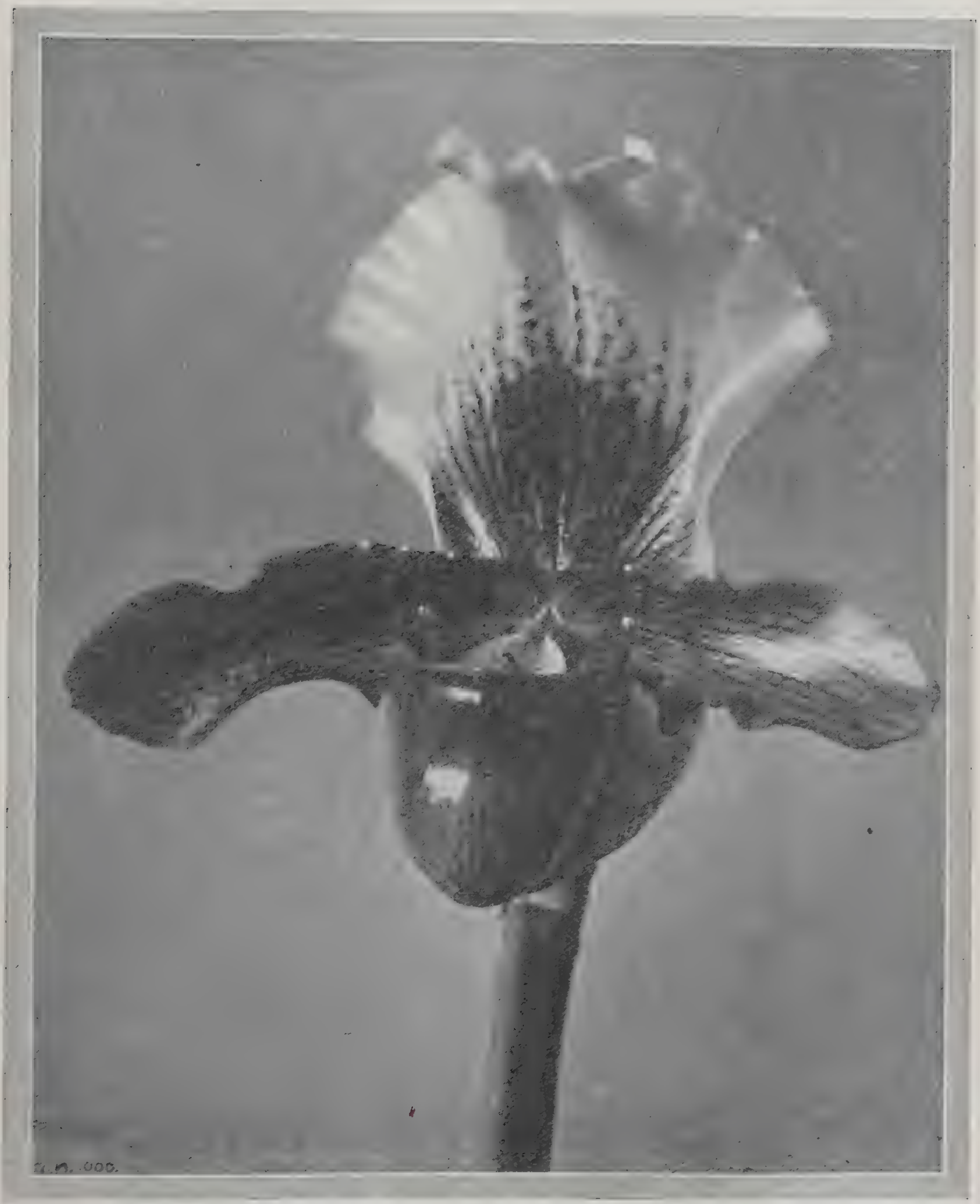


FIG. 158.—CYPRIPEDIUM × 'CYNTHIA,' WESTONBIRT VAR. (*From Gardeners' Magazine.*) (p. cclxviii.)

Silver Banksian Medal.

To Messrs. J. Cypher, Cheltenham, for a group.

First-class Certificate.

To *Cattleya* × *Hardyana* 'The Baron' (*Dowiana aurea* × *Warscewiczii* 'Frau Melanie Beyrodt') (votes, unanimous), from H. S. Goodson, Esq.

(gr. Mr. G. E. Day). Sepals and petals white. Lip like *C. Warscewiczii*, ruby-crimson, with a light yellow blotch on each side of the tube. (Fig. 157.)

Award of Merit.

To *Dendrobium taurinum Colmanii* (votes, unanimous), from Sir Jeremiah Colman, Bart. (gr. Mr. Collier). Sepals white, reflexed, petals longer and narrower, erect, twisted, rose-pink; lip large, white with rose margin. Philippine Isles.

To *Cirrhopetalum Fascinator* (votes, unanimous), from Sir Jeremiah Colman, Bart., V.M.H. Allied to *C. appendiculatum*, but larger. Upper sepal and petals greenish, striped and fringed with purple; lower sepals closely approached, six inches long, ending in slender blades, the basal part broad, whitish with purple warted centre.

To *Cypripedium* × 'Cynthia' (*Charlesianum* × *Charlesworthii*) (votes, 16 for, 4 against), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). Dorsal sepal white with thin dotted lines of rose. Petals and lip greenish, tinged with purple. (Fig. 158.)

To *Cypripedium* × *Faire-Maude* (*Fairrieanum* × *Maudiae*) (votes, 12 for, 3 against), from Mrs. N. C. Cookson, Oakwood, Wylam (gr. Mr. H. J. Chapman). Resembling a large, dark *C.* × 'Juno,' with a very fine dark rose-tinted and striped dorsal sepal.

Other Exhibits.

Lieut.-Col. G. L. Holford: hybrid Orchids.

Sir Jeremiah Colman, Bart., V.M.H: rare species.

Ed. Rogerson, Esq., Manchester: *Cypripedium* × 'Priam.'

Baron Sir H. Schröder: *Cattleya* × Lamberhurst hybrid (*intermedia* × *citrina*).

H. T. Pitt, Esq.: *Cattleya* × *newingtonense* ('Mrs. W. J. Whiteley' × *Harrisoniana*).

Monsieur Mertens: hybrid Odontoglossums.

W. Thompson, Esq.: two hybrids.

F. Menteith Ogilvie, Esq.: *Sophrocattleya* × 'Doris.'

R. Brooman-White, Esq.: Odontoglossums.

Mr. A. W. Jensen: *Odontoglossum Harryanum.*

Messrs. Armstrong & Brown: Laeliocattleyas.

J. Forster Alcock, Esq.: *Cypripedium* × 'Baron Schröder,' var. New-Hall-Hey.

ORCHID COMMITTEE, OCTOBER 26, 1909.

Mr. J. GURNEY FOWLER in the Chair, and nineteen members present.

Awards Recommended:—

Gold Medal.

To Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt, Tetbury (gr. Mr. H. G. Alexander), for a magnificent group, principally hybrid Cattleyas raised at Westonbirt, among which were sixty plants of

Cattleya × 'Fabia' (*labiata* × *Dowiana aurea*), with an aggregate of over three hundred flowers.

Silver-gilt Flora Medal.

To Ernest R. Ashton, Esq., Broadlands, Camden Park, Tunbridge Wells (gr. Mr. A Young), for a group in which *C. Bowringiana* and its hybrids were prominent.

To H. S. Goodson, Esq., Fairlawn, Putney (gr. Mr. G. E. Day), for a group.

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for a group.

To Messrs. Sander, St. Albans, for hybrids and rare species.

To Messrs. J. Cypher, Cheltenham, for Cypripediums, &c.

To Mr. E. V. Low for white forms of *Cattleya labiata*.

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for hybrids.

To Messrs. Stuart Low, Bush Hill Park, for a group.

To Messrs. McBean, Cooksbridge, for a group of *Cattleya Bowringiana.* and Odontoglossums.

Award of Merit.

To *Cypripedium* × 'Beacon' ('J. Howes' × *nitens Leeanum*) (votes, unanimous), from Lieut-Col. G. L. Holford, C.I.E., C.V.O., (gr. Mr. H. G. Alexander). A fine flower and an improvement on *C. nitens Sallieri* which it somewhat resembles. Ground colour greenish-yellow, the upper part of the dorsal sepal white, the lower bearing dotted brownish-purple lines.

To *Cypripedium* × *elatior* var. *Rex* (*Leeanum* × 'Baron Schröder') (votes, unanimous), from Messrs. Jas. Veitch. A perfectly shaped flower, an improvement on *C.* × 'Thalia.' Dorsal sepal broad, pure white with a small emerald-green base and purple feathered lines. Petals and lip primrose-yellow tinged with purple.

Cultural Commendation.

To Major G. C. Robertson, Widmerspool, Nottingham (gr. Mr. Wotton), for a fine plant of the natural hybrid *Cymbidium* × *Gammieanum*, with five spikes.

Other Exhibits.

His Grace the Duke of Marlborough (gr. Mr. Hunter): white-petalled *Cattleya* × 'Fabia.'

Leopold de Rothschild, Esq. (gr. Mr. Hudson): *Cattleya* × *Armstrongiae superba.*

Francis Wellesley, Esq. (gr. Mr. Hopkins): four white *Cattleya labiata.*

J. Forster Alcock, Esq.: hybrid Cypripedium.

Monsieur Maurice Mertens: Odontoglossums.

Orchid Committee, November 9, 1909.

Mr. Harry J. Veitch, V.M.H., in the Chair, and nineteen members present.

Awards Recommended :—

Silver Flora Medal.

To His Grace the Duke of Marlborough, Blenheim (gr. Mr. Hunter), for a group of *Vanda coerulea* and Oncidiums.

To Messrs. Charlesworth, Haywards Heath, for a group.

Silver Banksian Medal.

To Messrs. Stuart Low, Bush Hill Park, for Cattleyas, &c., including white forms of *C. labiata*.

To Messrs. Jas. Cypher, Cheltenham, for Cypripediums.

To E. Rogerson, West Didsbury, Manchester (gr. Mr. W. C. Price), for hybrid Cypripediums.

To Mr. E. V. Low, Haywards Heath, for white *Cattleya labiata*, &c.

Award of Merit.

To *Laeliocattleya* × 'Corunna,' Westonbirt variety (*L.-c.* × *Ingramii* × ?) (votes, 12 for, 4 against), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). Taller in growth than *L.-c.* × *Ingramii*. Flowers bright magenta-rose with ruby-crimson lip, having gold veining from the base.

To *Laeliocattleya* × 'Baroness Schröder' var. 'Madame Henriette' (*L. Jongheana* × *C. Trianaei*) (votes, 14 for), from Monsieur le Comte Joseph de Hemptinne, St. Denis Westrem, Ghent. Flowers rose-pink and differing from the original form in having a purple feathered line up the petals, and crimson-purple blotch on the yellow lip.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O. : new hybrid Cypripediums.

Sir Jeremiah Colman, Bart., V.M.H. (gr. Mr. Collier) : *Cattleya* × 'Portia' *coerulea*, and other Orchids.

H. S. Goodson, Esq. (gr. Mr. G. E. Day) : two hybrids.

Francis Wellesley, Esq. (gr. Mr. Hopkins) : hybrid Cypripediums.

J. Gurney Fowler, Esq. (gr. Mr. J. Davis) : *Cypripedium* × 'Troilus.'

Monsieur Mertens, Ghent : Odontoglossums.

R. Brooman-White, Esq. : *Odontoglossum crispum* varieties.

G. P. Walker, Esq. (gr. Mr. McGregor) *Odontoglossum* × 'Jasper' (*amabile* × *crispum roseum*).

ORCHID COMMITTEE, NOVEMBER 23, 1909.

Mr. HARRY J. VEITCH, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for Cypripediums.
To Messrs. Charlesworth, Haywards Heath, for hybrids.

Silver Banksian Medal.

To Messrs. Stuart Low, Bush Hill Park, for a group.
To Messrs. Cypher, Cheltenham, for Cypripediums.
To Messrs. McBean, Cooksbridge, for a group.

First-class Certificate.

To *Laeliocattleya* × 'Barbarossa,' Westonbirt variety (*C. Trianaei* 'Imperator' × *L.-c.* × *callistoglossa*) (votes, 14 for, 1 against), from Lieut-Col. G. L. Holford. Resembling *L.-c.* × *callistoglossa ignescens*, but of thicker substance. Sepals and petals magenta-rose; lip ruby-red with a yellow disc.

To *Cypripedium* × *Boltonii* (parentage unknown) (votes, unanimous), From W. Bolton, Esq. In form nearest to *C.* × 'Venus,' but larger; pure white with a few minute blackish dots at the base of the dorsal sepal. (Fig. 159.)

To *Cirrhopetalum longissimum* (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O. A very remarkable species, said to have been imported from Siam. The slender scape bore at the apex, a very short raceme of seven flowers drooping almost in an umbel. The flowers, which were nearly nine inches in length, were white with rose-coloured lines. (Fig. 160.)

Award of Merit.

Cattleya × 'Dirce' *superba* (× 'Vulcan' × *Warscewiczii*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander). Flowers deep rosy-mauve, the lip being the darker.

To *Zygocolax* × *Charlesworthii* (*Z.* × *Perrenoudii* × *C. jugosus*) (votes, 15 for, 1 against), from Messrs. Charlesworth. Sepals and petals cream-white, closely barred with chocolate purple. Lip violet with white margin.

Botanical Certificate.

To *Bulbophyllum hirtum*, from Mr. Gurney Wilson, Haywards Heath. A small Burmese species with a pendulous raceme of small white hairy flowers.

Other Exhibits.

Lieut-Col. G. L. Holford, C.I.E., C.V.O.: several hybrids.

Francis Wellesley, Esq.; Cypripediums and *Laeliocattleya* × 'King Manoel.'

Mrs. Cookson: white *Calanthe* × *Cooksoniae.*
H. S. Goodson, Esq.: hybrid Cattleya.

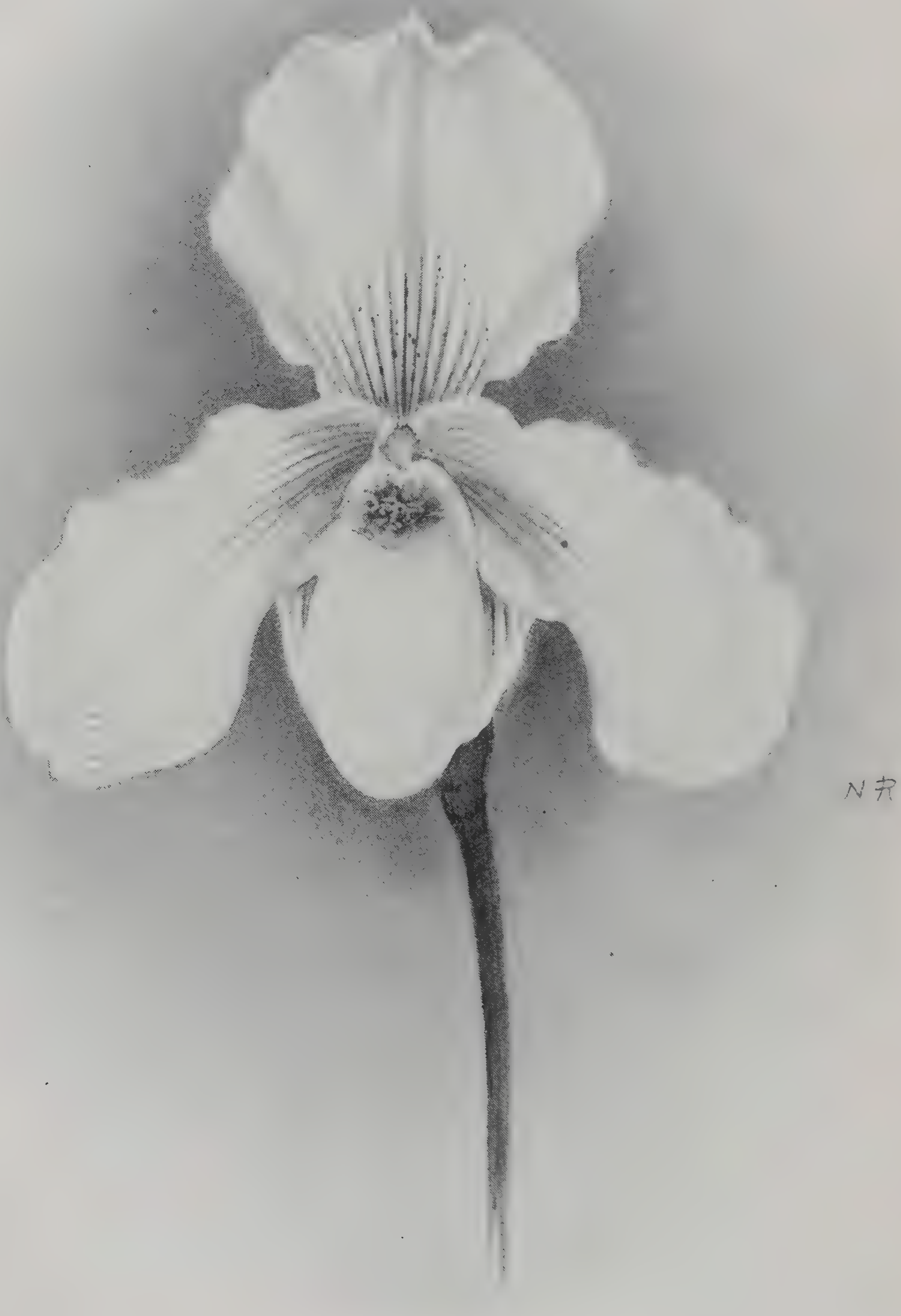


FIG. 159.—CYPRIPEDIUM × BOLTONII. (p. cclxxi.)

Monsieur Mertens: Odontoglossums.
J. Gurney Fowler, Esq.: *Cypripedium* × 'Ville de Paris.'

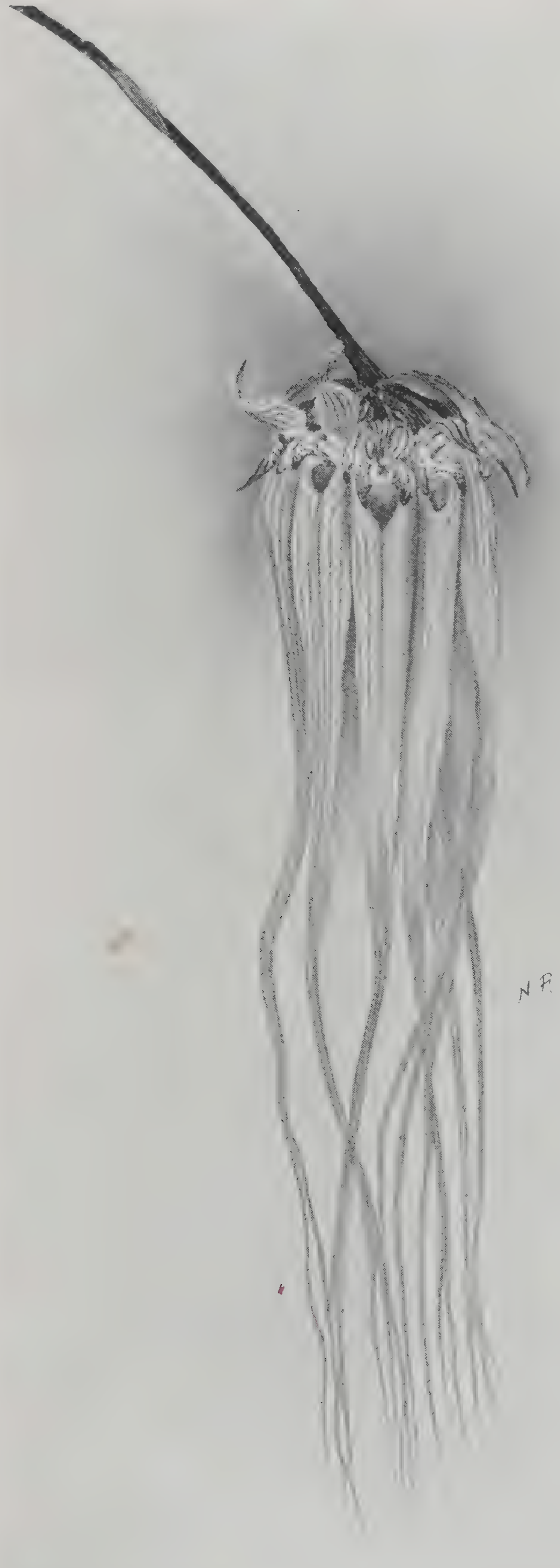


FIG. 160.—CIRRHOPETALUM LONGISSIMUM. (p. cclxxi.)

Messrs. Stanley: Cypripediums.
Messrs. Armstrong & Brown; rare Cypripediums.
G. P. Walker, Esq.: *Brassocattlaelia* × 'Surprise' (*C. bicolor* × *B.-l.-c.* × *Digbyano-purpurata*).

ORCHID COMMITTEE, DECEMBER 7, 1909.

Mr. J. GURNEY FOWLER in the Chair, and nineteen members present.

Awards Recommended:—

Silver Flora Medal.

To H. S. Goodson, Esq. (gr. Mr. G. E. Day), for a group.
To Messrs. Sander, St. Albans, for Cypripediums.
To Messrs. Charlesworth, Haywards Heath, for hybrids.

Silver Banksian Medal.

To Messrs. Mansell and Hatcher, Rawdon, for a group.
To Messrs. Cypher, Cheltenham, for Cypripediums.

Award of Merit.

To *Cypripedium* × 'Lion' (× 'Boadicea' × *Sallieri Hyeanum*) (votes, 10 for, 5 against), from Messrs. Sander, St. Albans. A very large flower with rose-coloured dorsal sepal with a green base and white tip. Petals and lip honey-yellow tinged with red-brown.

Botanical Certificate.

To *Monomeria barbata* Lindl., from the Royal Botanic Gardens, Glasnevin, Dublin. A singular species having the growth of a *Bulbophyllum*. Pseudo-bulbs roundish, distantly placed on stout one-leafed rhizomes. Infloresence about a foot in height, and bearing about twenty flowers, somewhat resembling those of a *Gongora*. Upper sepal ovate-acuminate and resting on the column; lower sepals connate and twisted, larger than the upper, and hairy. Lip poised on the upturned end of the column, hinged, moving up or down as the position of the flower is changed. Colour greenish-white marked with red. Figured in King and Pantlin's *Orchids of the Sikkim Himalaya*, t. 208.

Other Exhibits.

Lieut.-Col. G. L. Holford, C.I.E., C.V.O. (gr. Mr. H. G. Alexander): new hybrid Cypripediums.
Francis Wellesley, Esq. (gr. Mr. Hopkins): Cypripediums.
Messrs. Stuart Low: a group.
His Grace the Duke of Marlborough: Cypripediums.
Sir Jeremiah Colman, Bart.: *Laeliocattleya* × 'Epicasta' *Colmaniae*.
Mr. E. V. Low: a group.
C. L. N. Ingram, Esq.: two Laeliocattleyas.
Monsieur Mertens: hybrid Odontoglossums.
E. Rogerson, Esq.: *Cypripedium insigne albens*.

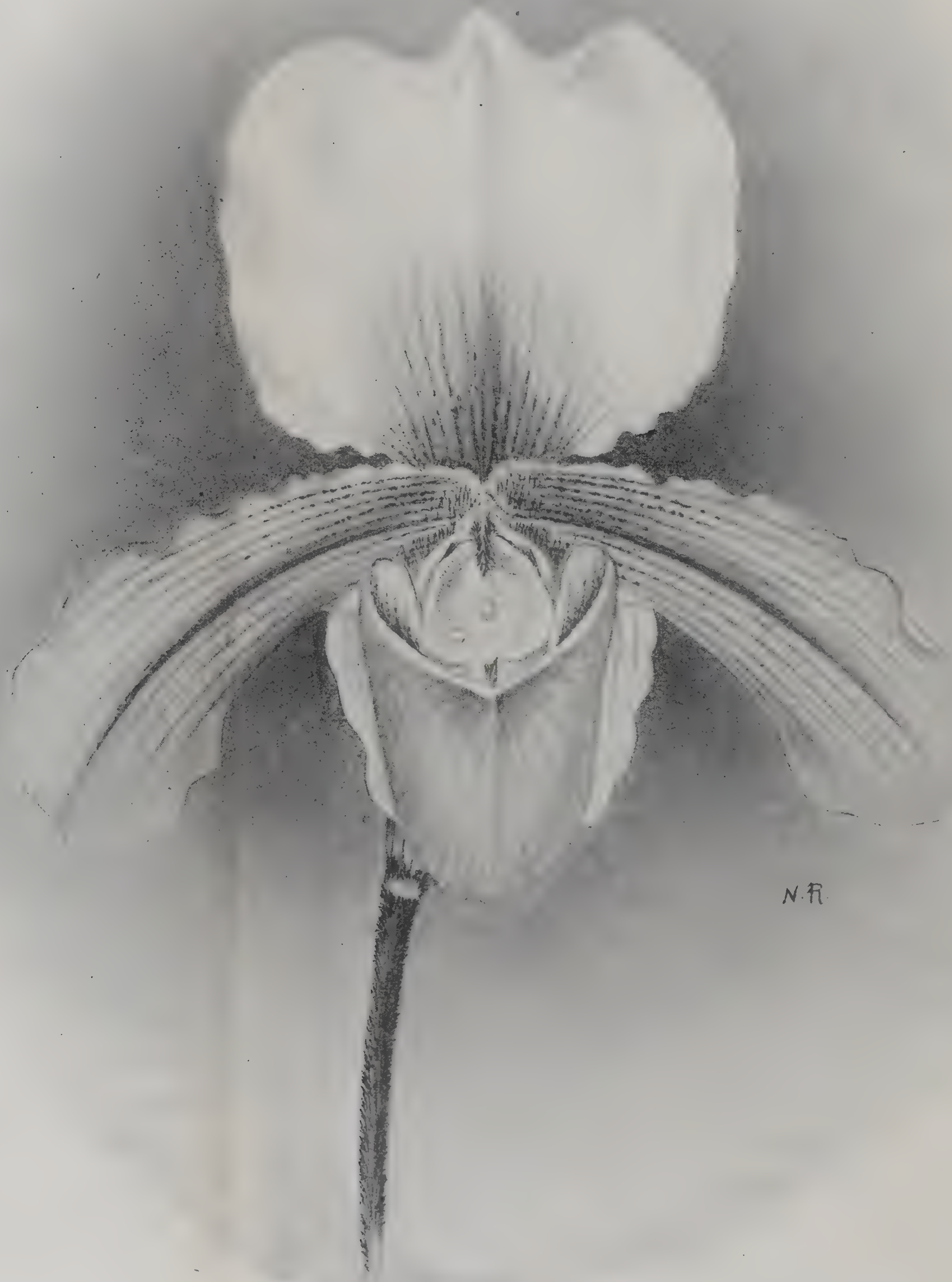


FIG. 161.—CYPRIPEDIUM × 'MRS. F. SANDER. (p. cclxxv.)

(To face page cclxxv.)

ORCHID COMMITTEE, DECEMBER 21, 1909.

Mr. J. GURNEY FOWLER in the Chair, and fourteen members present.

Awards Recommended :—

First-class Certificate.

To *Cypripedium* × 'Mrs. F. Sander' (× 'Eve' × *insigne Sanderae*) (votes, 8 for, 4 against), from Messrs. Sander, St. Albans. A fine flower of the albino class. Dorsal sepal large, pure white with a small emerald green base. Petals and lip pale greenish primrose yellow slightly tinged with light purple. (Fig. 161.)

To *Dendrobium Phalaenopsis album*, Sander's variety (votes, unanimous), from Messrs. Sander. Flowers pure white, larger and rounder than those of the original form.

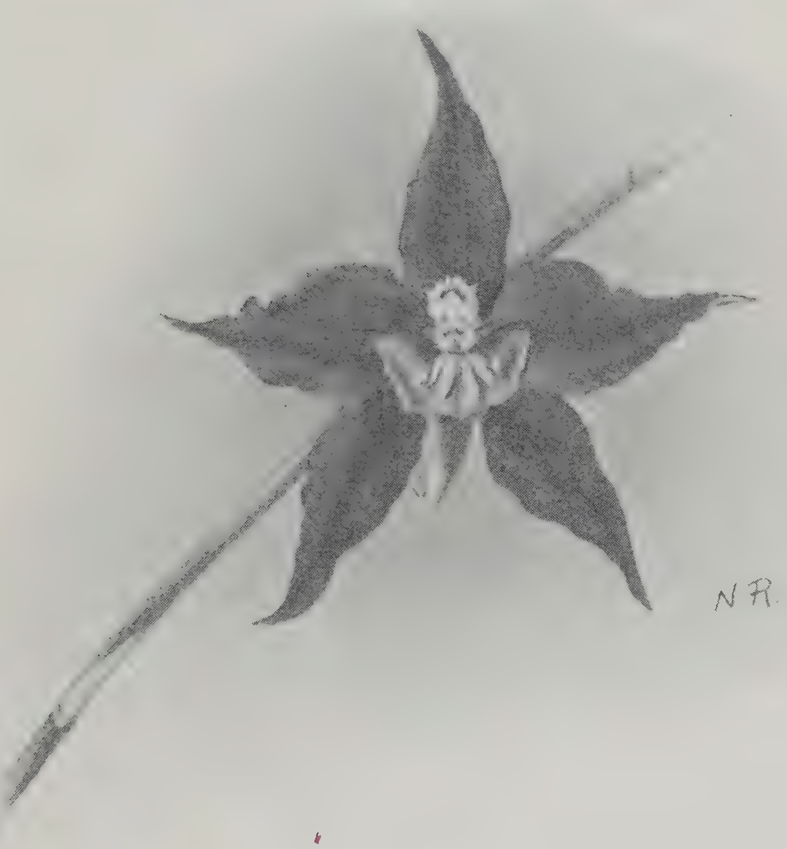


FIG. 162.—ODONTIODA × KEIGHLEYENSIS, FOWLER'S VARIETY.

To *Odontioda* × *Keighleyensis*, Fowler's variety (*Cochlioda Noezliana* × *Odontoglossum cirrhosum*) (votes, unanimous), from J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis). Flowers deep reddish scarlet, the sepals and petals apiculate, and the front lobe of the lip reflexed. (Fig. 162.)

To *Zygocolax* × *Charlesworthii rubida* (*Z.* × *Perrenoudii* × *C. jugosus*) (votes, unanimous), from Messrs. Charlesworth, Haywards

Heath. Differing from the violet-coloured original in having the lip and markings on the petals purplish ruby-red. (Fig. 163.)

To *Laeliocattleya* × *Firminii* (*L.-c.* × 'Ceres' × *C. Dowiana aurea*) (votes, unanimous), from Monsieur Firmin Lambeau, Brussels. Form and shape of *C.* × *Hardyana*. Sepals and petals Indian yellow tinged with rose. Lip purplish crimson with yellow disc. (Fig. 164).

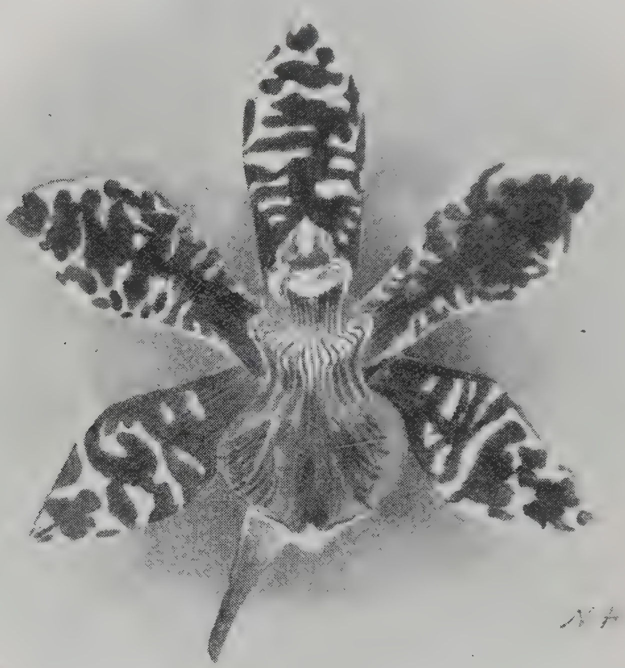


FIG. 163.—ZYGOCOLAX × CHARLESWORTHII RUBIDA. (p. cclxxv.)

Award of Merit.

To *Cypripedium* × 'Alabaster' *magnificum* (× *Godseffianium* × 'Alcibiades' *superbum*) (votes, unanimous), from Lieut.-Col. G. L. Holford, C.I.E., C.V.O., Westonbirt (gr. Mr. H. G. Alexander). A distinct hybrid, the white dorsal sepal having three broad bands of purple. Petals and lip yellowish with a tinge of purple.

Certificate of Appreciation.

To *Oncidium* × *hybridum* (*tigrinum* × *lamelligerum*), from Messrs. Charlesworth. The flowers resemble *O. tigrinum*, but have a narrow elongated yellow lip. The brown sepals are stalked.

Other Exhibits.

Lieut.-Col. G. L. Holford: Cypripedium × 'Caruso.'
H. S. Goodson, Esq.: two hybrid Cypripediums.
Francis Wellesley, Esq.: Cypripediums.
Mr. Stuart Low: *Cattleya Percivaliana alba.*
Messrs. Armstrong & Brown: *Brassocattleya* × *Thorntonii alba.*

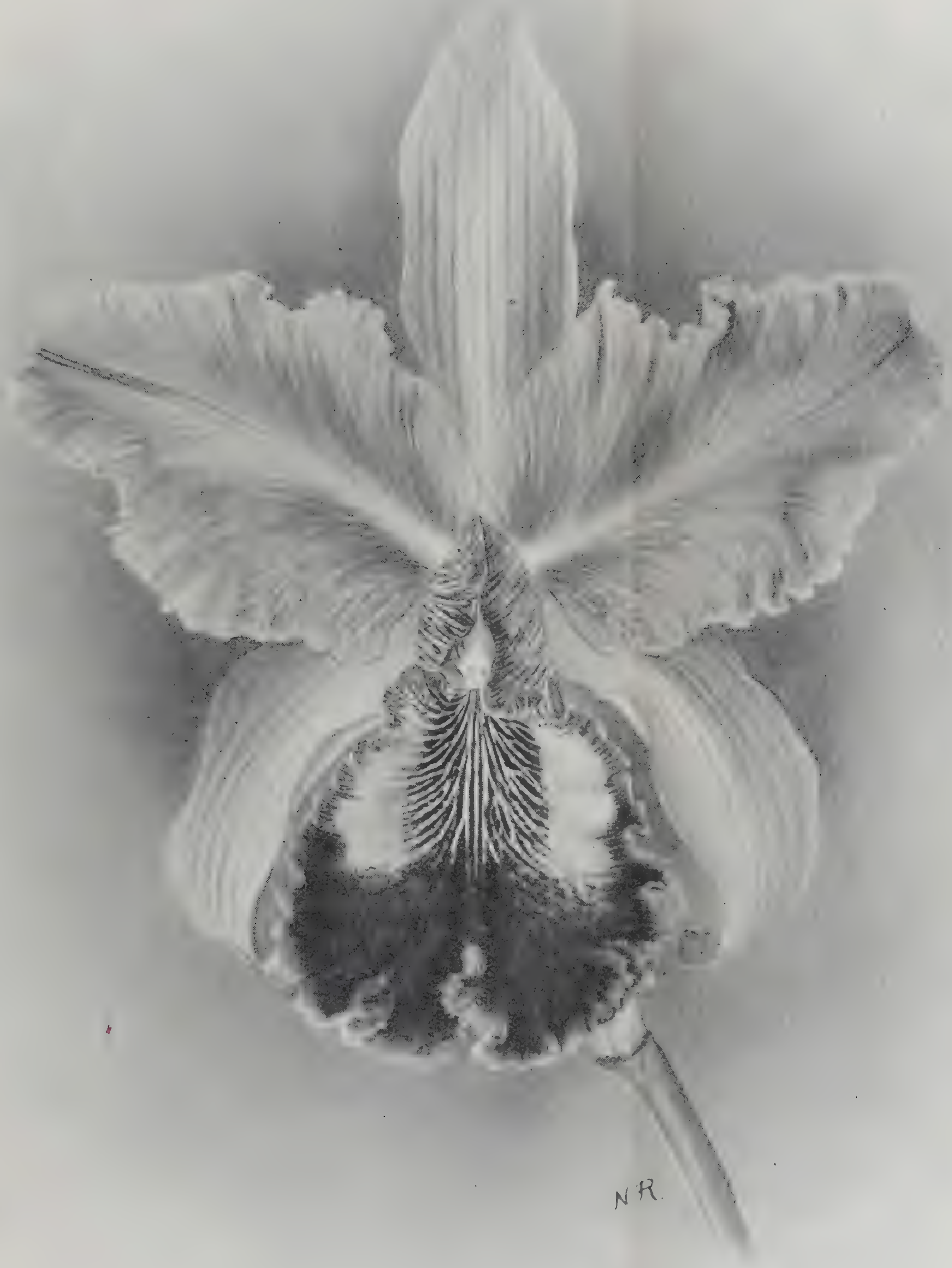


FIG. 164.—LAELIOCATTLEYA × FIRMINII. (p. cclxxvi.)

(To face page cclxxvi.)

ESTABLISHED
1804.

INCORPORATED
1809.

TELEGRAMS:
"HORTENSIA, LONDON."

TELEPHONE:
5363 WESTMINSTER.

ROYAL HORTICULTURAL SOCIETY,

VINCENT SQUARE, WESTMINSTER, S.W.

NOTICES TO FELLOWS.

1. General.
2. Letters.
3. Telephone and Telegrams.
4. Journals Wanted.
5. Subscriptions.
6. Form of Bequest.
7. Privileges of Chemical Analysis.
8. List of Fellows.
9. New Fellows.
10. An Appeal.
11. The Society's Gardens at Wisley.
12. Trials at Wisley in 1910–11.
13. The Wisley Research Station.
14. Students at Wisley.
15. Distribution of Surplus Plants.
16. Hiring of the Society's Hall.
17. Exhibitions, Meetings, and Lectures.
18. Suggested Show at Liverpool.
19. British Fruit and Vegetables.
20. Challenge Cups for Vegetables.
21. Colonial-grown Fruit Show, 1910.
22. Shows of kindred Societies in 1910.
23. Lectures.
24. "The Masters Lectures."
25. Examinations, 1910.
26. Information.
27. Inspection of Fellows' Gardens.
28. Affiliation of Local Societies.
29. Union of Horticultural Mutual Improvement Societies.
30. Colour Chart.
31. Monograph on Fungoid Pests.
32. Alterations in Rules for Judging.
33. Spraying of Fruit Trees.
34. Varieties of Fruits.
35. List of Plants Certificated.
36. International Horticultural Exhibition, 1912.
37. Advertisements.

1. GENERAL.

Notices to Fellows are always added at the end of each number of the JOURNAL, immediately preceding the Advertisements, and also at the beginning both of the "Book of Arrangements" and of the "Report of the Council." Fellows are particularly requested to consult these Notices, as it would often save them and the Secretary much needless correspondence.

2. LETTERS.

All letters on *all* subjects should be addressed—The Secretary, Royal Horticultural Hall, Vincent Square, Westminster, S.W.

3. TELEPHONE AND TELEGRAMS.

Telephone Number: **5363 WESTMINSTER.**
"**HORTENSIA, LONDON,**" is sufficient address for telegrams.

4. JOURNALS WANTED.

The Secretary would be greatly obliged by the return to the Society of ANY NUMBERS of the JOURNAL which may be of no further use to Fellows. Complete sets are occasionally applied for, but, at the present moment, not even one can be supplied owing to the stock of the following being exhausted:—

VOLUME V. Part 1.
VOLUME X.
VOLUME XIII. Part 1.

These are therefore particularly asked for.

5. SUBSCRIPTIONS

All Subscriptions fall due on January 1st of each year. To avoid the inconvenience of remembering this, Fellows can *compound* by the payment of one lump sum in lieu of all further annual payments; or they can, by applying to the Society, obtain a form of instruction to their bankers to pay for them every January 1st. It may be a week or more before the Tickets reach the Fellow, owing to the very large number, over 20,000, to be despatched within the first month of the year. Fellows who have not already given an order on their bankers for the payment of their subscriptions each year are requested to do so, as this method of payment is preferred, and saves the Fellows considerable trouble. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

In paying their subscriptions, Fellows often make the mistake of drawing their cheques for Pounds instead of for Guineas. Kindly note that in all cases it is Guineas, and not Pounds. Cheques and Postal Orders should be made payable to "The Royal Horticultural Society" and crossed "London County and Westminster Bank, Victoria Branch, S.W."

6. FORM OF BEQUEST.

I give and bequeath to the Treasurer for the time being of the Royal Horticultural Society, London, the sum of £ , to be paid out of such part of my personal estate as I can lawfully charge with the payment of such legacy, and to be paid free of legacy duty, within six months of my decease; the receipt of such Treasurer to be a sufficient discharge for the same. And I declare that the said legacy shall be applied towards [the general purposes of the Society].*

7. PRIVILEGES OF CHEMICAL ANALYSIS.

Instructions are contained at page 68 in the "Book of Arrangements," 1910.

8. LIST OF FELLOWS.

A list of all the Fellows of the Society is sent out in January. Fellows are requested to look at their own names in it, and if in any way these are incorrect, or the address insufficient, they are requested to inform the Secretary at once. Forms of Nomination, and of the Privileges of Fellows, are bound in with every number of the JOURNAL (see advertisement pages 32 and 33) and the "Book of Arrangements."

9. NEW FELLOWS.

The President and Council fully appreciate how much the prosperity of the Society and its present large number of Fellows is due to the efforts of Fellows to enlist the sympathy of their friends; and the steady advance during recent years indicates the increasing recognition of the Society's work and usefulness. But it must not be supposed that a maximum has yet been reached. There is ample room for a great increase of Fellows, in the North of England especially, as well as in America and the Colonies.

10. AN APPEAL.

What has been accomplished for the Society since 1887 is largely due to the unwearied assistance afforded by a small proportion of the Fellows; but as all belong to the same Society, so it behoves each one to do what he or she can to further its interests, especially in:—

1. Increasing the number of Fellows.
2. Helping to swell the General Prize Fund started by Mr. A. W. Sutton, V.M.H., for providing Prizes for the Students at Wisley.
3. Lectures with lantern slides.
4. Books are required to fill the gaps in the Library both at Vincent Square and at Wisley.
5. New and rare Plants and Seeds are wanted for the Garden and surplus roots for distribution to the Fellows.

Thus there is plenty for all to do according to their individual liking: personal effort, money, plants, books, are all alike needed. The Secretary, therefore, asks those who read these lines to do their best to help in any of the ways above indicated.

Since the above was written the following has been received for

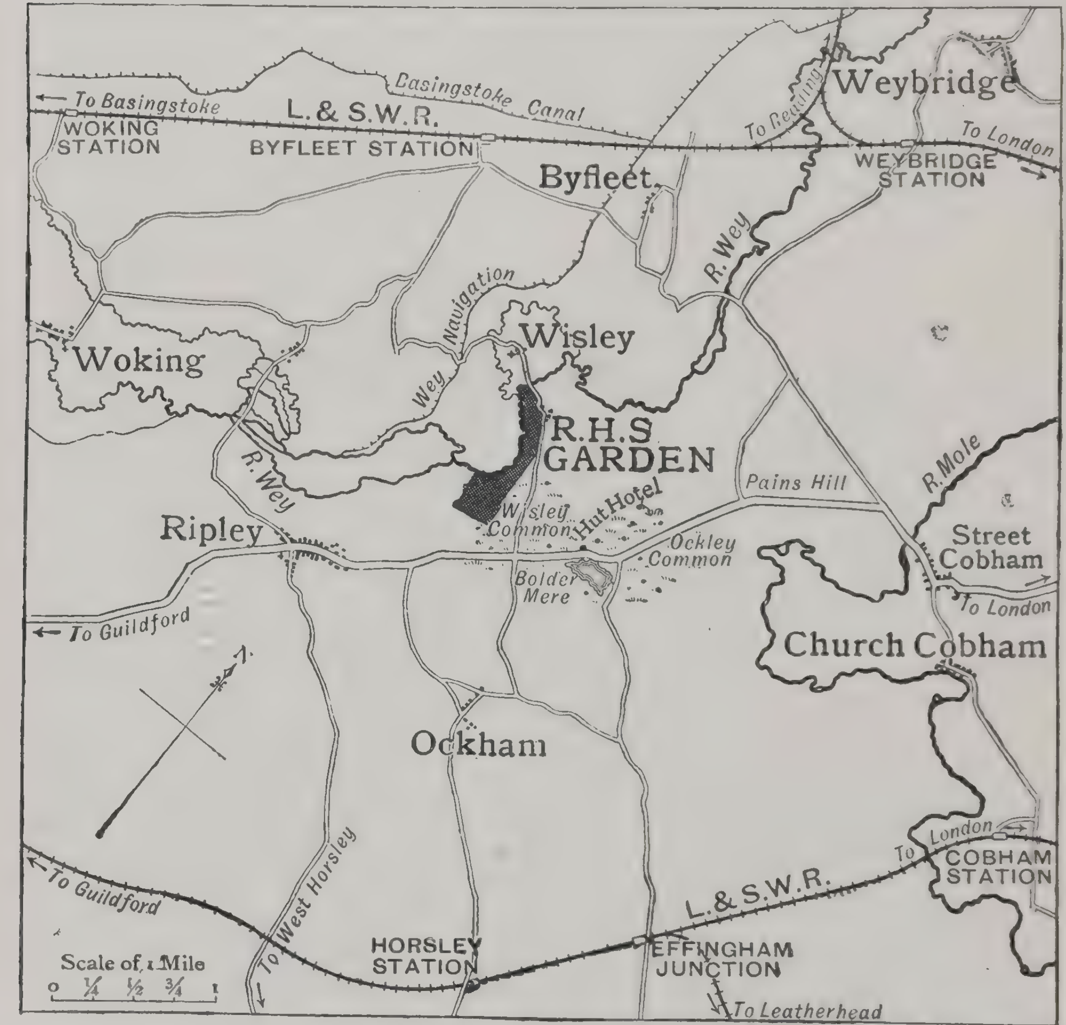
---

* Any special directions or conditions which the testator may wish to be attached to the bequest may be substituted for the words in brackets.

Wisley: A set bound in seven octavo and three quarto volumes, of all the reports and papers published since 1843 recording the results of the Rothamsted investigations conducted by Sir John Bennet Lawes, Bart., and Sir J. Henry Gilbert, presented by the Board of Agriculture with the sanction of His Majesty's Treasury.

11. THE SOCIETY'S GARDENS AT WISLEY.

The Gardens are open daily to Fellows and others showing Fellows' Transferable Tickets from 9 A.M. till sunset, except on Sundays, Good Friday, Christmas Day, and Exhibition days. Each Fellow's ticket admits three to the Gardens. The Public are not admitted.



Walker & Cockerell sc.

Position of the Society's Gardens

The Gardens, situated at Wisley (about 2 miles from Ripley, in Surrey), are about 3 miles from Byfleet, 3½ miles from Horsley, and 5½ miles from Weybridge, all stations on the South-Western Railway, with frequent trains from Waterloo and Clapham Junction. Carriages to convey four persons can be obtained by writing to Mr. D. White, fly proprietor, Ripley, Surrey; the charge being, to and from Weybridge, waiting two hours at the Gardens, 8*s.*; or waiting three hours 10*s.*;

or to and from Horsley, 7*s.*; Effingham Junction, 7*s.*; Byfleet, 7*s.* Visitors should in all cases be careful to state the trains they intend to arrive by and leave by. Carriages can also be obtained at Weybridge for 8*s.* by writing to Mr. Trembling, New Road, Weybridge. Excellent accommodation and refreshments can be had at the Hut Hotel, close to the Gardens, and also at the Hautboy at Ockham.

The motor route from London to Wisley will be found in the "Book of Arrangements," p. 106.

12. TRIALS AT WISLEY IN 1910–11.

Trials of Fruits, Flowers, and Vegetables at the Wisley Gardens during 1910–11 have been arranged:—

N.B.—Everything sent for trial *must be named*, and the name and address of the Sender attached.

For full particulars see "Book of Arrangements for 1910," p. 107.

13. THE WISLEY RESEARCH STATION.

Investigations are now in full swing at the new Research Station and Laboratory at Wisley. All communications relating to them should be addressed to Mr. F. J. Chittenden, F.L.S., Director of the Research Work on Scientific Matters affecting Practical Horticulture, and Lecturer to the Students.

14. STUDENTS AT WISLEY.

The Society admits young men, between the ages of 16 and 22 years, to study Gardening at Wisley. The curriculum includes not only practical garden work in all the main branches of Horticulture, but also lectures, demonstrations, and elementary Horticultural Science in the Laboratory, whereby a practical knowledge of simple Garden Chemistry, Biology, &c., may be obtained. The Laboratory is equipped with the best apparatus procurable for Students. The training extends over a period of two years, with a progressive course for each year. Students can enter only at the end of September or at the end of March. Selected Students have also the advantage of attending certain of the Society's Shows and Lectures in London.

15. DISTRIBUTION OF SURPLUS PLANTS.

In a recent Report the Council drew attention to the way in which the annual distribution of surplus plants has arisen. In a large garden there must always be a great deal of surplus stock, which must either be given away or go to the waste heap. A few Fellows, noticing this, asked for plants which would otherwise be discarded; and they valued what was so obtained. Others hearing of it asked for a share, until the Council felt they must either systematize this haphazard distribution or else put a stop to it altogether. To take the latter step seemed undesirable. Why should not such Fellows have them as cared to receive such surplus plants? It was therefore decided to keep all plants till the early spring, and then give all Fellows alike the option of claiming a share of them by ballot.

Fellows are therefore particularly requested to notice that only waste and surplus plants raised from seeds or cuttings are available for distribution. Many of them may be of very little intrinsic value, and it is only to avoid their being absolutely wasted that the distribution is permitted. The great majority also are of necessity *very small*, and may require careful treatment for a time.

Fellows are particularly requested to note that a Form of Application and list to choose from of the plants available for distribution is sent in January *every year* to every Fellow, enclosed in the "Report of the Council." To avoid all possibility of favour, all application lists are kept until the last day of February, when they are all thrown into a Ballot; and as the lists are drawn out, so is the order of their execution, the plants being despatched as quickly as possible after March 1.

Of some of the varieties enumerated the stock is small, perhaps not more than twenty-five or fifty plants being available. It is therefore obvious that when the Ballot is kind to any Fellow he will receive the majority of the plants he has selected, but when the Ballot has given him an unfavourable place he may find the stock of almost all the plants he has chosen exhausted. A little consideration would show that all Fellows cannot be first, and some must be last, in the Ballot. Application forms received after March 1 and before April 30 are kept till all those previously received have been dealt with, and are then balloted in a similar way. Fellows having omitted to fill up their application form before April 30 must be content to wait till the next year's distribution. The work of the Gardens cannot be disorganized by the sending-out of plants at any later time in the year. All Fellows can participate in the annual distribution *following* their election.

The Society does not pay the cost of packing and carriage. The charge for this will be collected by the carriers on delivery of the plants, which will be addressed exactly as given by each Fellow on his application form. It is impracticable to send plants by post, owing to the lack of Post Office facilities for despatch without prepayment of postage.

Fellows residing beyond a radius of thirty-five miles from London are permitted to choose double the number of plants to which they are otherwise entitled.

Plants cannot be sent to Fellows residing outside the United Kingdom, owing either to length of time in transit or to vexatious regulations in some foreign countries; but the Council will at any time endeavour to obtain for Fellows living abroad any unusual or rare seeds which they may have been unable to procure in their own country.

No plants will be sent to Fellows whose subscription is in arrear.

The following letter (one amongst many) is a testimony to the interest felt in the distribution of surplus and waste plants:—

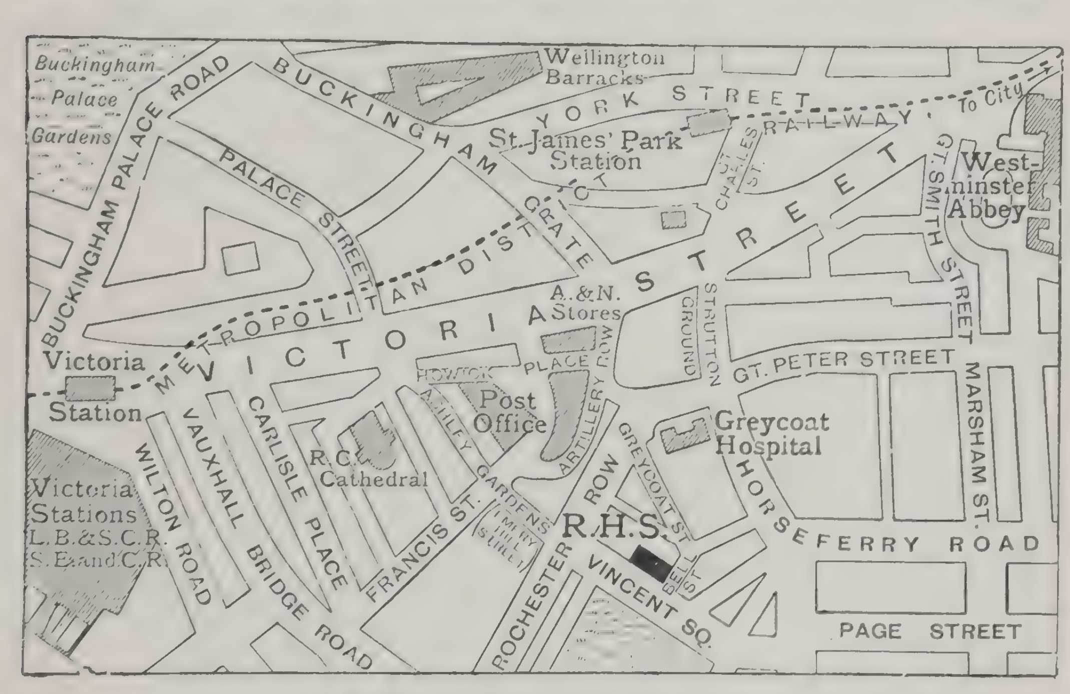
February 1, 1910.

Dear Sir,—I cannot send in my application for plants without adding a line to thank you for the plants sent last year. Though I was not successful in getting any I had chosen, I was simply delighted with the choice which had been made for me, and the little strangers are thriving splendidly.

16. HIRING OF THE SOCIETY'S HALL.

The Royal Horticultural Hall and Offices are situated in Vincent Square, which lies straight through Ashley Gardens from Victoria Street, Westminster, and is about five minutes' walk from the Victoria and St. James's Park Stations.

Fellows are earnestly requested to make known among their friends and among other institutions that the Royal Horticultural Hall is available for Meetings, Shows, Exhibitions, Concerts, Conferences, Lectures, Balls, Banquets, Bazaars, Receptions, and other similar purposes.



Position of the Society's Hall.

The Hall has a floor surface of 13,000 square feet. It is cool in summer and warm in winter. For a Concert it will seat 1,500, or for a public meeting 1,800. A Sound-board has been added, and it was recently said by one of the candidates in the parliamentary election that the Hall is now a place where speaking becomes easy and delightful. Full particulars for hiring may be obtained on application to the Secretary, R.H.S., Vincent Square, Westminster, S.W., with whom dates may be booked.

17. EXHIBITIONS, MEETINGS, AND LECTURES IN 1910.

The programme will be found in the "Book of Arrangements" for 1910. An Exhibition and Meeting is held practically every fortnight throughout the year, and a short lecture on some subject connected with Horticulture is delivered during the afternoon.

A reminder of every Show will be sent in the week preceding to any Fellow who will send to the R.H.S. Offices, Vincent Square, S.W., a sufficient number (33) of halfpenny cards *ready addressed* to himself.

The following are the dates fixed for 1910 :—

Jan. 11, 25
Feb. 8, 22
March 8 and 9 (Bulbs), 22, 23
April 5, 19
May 3, 17, 19, 24 to 26 (Temple Show)
June 7, 21
July 5 and 6 (Holland Park), 12 and 13, 19 and 26.
August 2, 16, 30
Sept. 13 and 15, 27, 28
Oct. 11, 13 and 14 (Fruit Show), 25 (Vegetable Show)
Nov. 8, 22
Dec. 1–3, 6, 13

18. SUGGESTED SHOW AT LIVERPOOL.

The Royal Agricultural Society have withdrawn their suggestion that a show should be held under the auspices and organization of the Royal Horticultural Society. The announcements on pages 18, 48, and 56 in the "Book of Arrangements," 1910, are in consequence cancelled.

19. BRITISH FRUIT AND VEGETABLES.

In 1910, instead of the system of scattering the prizes offered all through the year, they will be concentrated on two meetings, the Great Fruit Show being held on October 13 and 14, and the Vegetable prizes being combined with the Ordinary Meeting on October 25. The Schedules of the Prizes are now ready on application.

20. CHALLENGE CUPS FOR VEGETABLES.

A handsome £20 Challenge Cup has been presented to the Society by Messrs. Sutton, of Reading, and the Council have decided to offer it, with £10, for the best collection of twelve kinds of vegetables on October 25. The Society also offers a Champion Challenge Cup for the greatest number of points obtained by any one exhibitor throughout the same Exhibition, the winner of the Sutton Cup being excluded. These Cups may only be won by the same exhibitor once in four years, but he may compete every year for any second prize that may be offered.

21. COLONIAL-GROWN FRUIT SHOW, 1910.

An Exhibition of Colonial-grown Fruits and Vegetables will be held on December 1 to 3, 1910.

Particulars will be found in the "Book of Schedules" for 1910.

22. SHOWS OF KINDRED SOCIETIES IN 1910.

The following dates have been fixed, on which R.H.S. Fellows' tickets will admit :—

March 23.—Stour Valley Gardening Society.
May 3.—Auricula and Primula Society.

May 17.—Tulip Society.
May 19.—Perpetual Flowering Carnation Society.
July 12 13.—Sweet Pea Society.
July 26.—Carnation and Picotee Society.
September 15.—Rose Society.
September 28.—Vegetable Society.
December 13.—Carnation Society.

For Schedules of these Shows see under above dates in the "Book of Arrangements," 1910.

23. LECTURES.

The new Lecture Room is fitted with an electric lantern of the most modern construction; gas and water are laid on, and every provision has been made for the illustration and delivery of Lectures.

Any Fellows willing to Lecture, or to communicate Papers on interesting subjects, are requested to communicate with the Secretary.

24. "THE MASTERS LECTURES."

Fellows will remember the intimate connection with the Society of the late Dr. Masters, F.R.S., who did much for horticulture by drawing constant attention to the various ways in which scientific discovery and research might be made serviceable to gardening; and it will also be remembered that a fund was established by subscription to perpetuate his memory in connection with the Society and to carry on in some degree his work of science in relation to gardening. "The Masters Lectures" were accordingly founded, and the first two were given during 1909 by Professor Hugo de Vries, of Amsterdam.

In 1910 Mr. A. D. Hall, M.A., F.R.S., is the Lecturer on February 22 and March 22, his subject being "The Adaptation of the Plant to the Soil."

25. EXAMINATIONS, 1910.

1. The Annual Examination in the Principles and Practice of Horticulture will be held on Wednesday, April 20, 1910. The examination has two divisions, viz. (*a*) for Candidates of eighteen years of age and over, and (*b*) for Juniors *under* eighteen years. Candidates should send in their names not later than March 30. Full particulars may be obtained by sending a stamped and directed envelope to the Society's Offices. Copies of the Questions set from 1893 to 1909 (price 2*s.* post free) may also be obtained from the Office. The Society is willing to hold an examination wherever a magistrate, clergyman, schoolmaster, or other responsible person accustomed to examinations will consent to supervise one on the Society's behalf.

The Society is prepared to extend this examination to residents in the Colonies; and, at the request of the Government of the United Provinces of India, this test was held in 1909—altered and adapted to the special requirements of India—at Saharanpur and Calcutta.

In connection with this examination a Scholarship of £25 a year for two years is offered by the Worshipful Company of Gardeners, to be awarded after the 1910 examination to the student who shall pass highest, if he is willing to accept the conditions attaching thereto. The main outline of these conditions is that the holder must be of the male sex, and between the ages of 18 and 22 years, and that he should study gardening for one year at least at the Society's Gardens at Wisley, conforming to the general rules laid down there for Students. In the second year of the Scholarship he may, if he like, continue his studies at some other place at home or abroad which is approved by the Council of the Society. In case of two or more eligible Students being adjudged equal, the Council reserve to themselves the right to decide which of them shall be presented to the Scholarship.

2. The Society will hold an Examination in Cottage Gardening on Wednesday, April 27, 1910. This examination is intended for, and is confined to, Elementary and Technical School Teachers. It is undertaken in view of the increasing demand in country districts that the Schoolmaster shall be competent to teach the elements of Cottage Gardening, and the absence of any test of such competence. The general conduct of this examination will be on similar lines to that of the more general examination. Questions on Elementary Chemistry and Biology are now added to this examination.

3. The Society will hold an examination in the Royal Horticultural Hall, Vincent Square, S.W., on Monday, January 16, 1911, for gardeners employed in Public Parks and Gardens belonging to County Councils, City Corporations, and similar bodies. Entries close on January 2, 1911.

Medals and Certificates are awarded and Class Lists published in connection with these examinations. The Syllabus may be obtained on application to the Secretary R.H.S., Vincent Square.

26. INFORMATION.

Fellows may obtain information and advice from the Society as to the names of flowers and fruit, on points of practice, insect and fungoid attacks, and other questions by applying to the Secretary R.H.S., Vincent Square, Westminster, S.W. Where at all practicable it is particularly requested that letters and specimens may be timed to reach Vincent Square by the first post on the mornings of the Fortnightly Meetings, so as to be laid before the Scientific or other Committees at once.

27. INSPECTION OF FELLOWS' GARDENS.

The Inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost, viz. a fee of £3 3*s.* for one day (or £5 5*s.* for two consecutive days), together with all out-of-pocket expenses. No inspection may occupy more than two days, save by special arrangement. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their gardens. Gardens can only be inspected at the *written* request of the *owner.*

28. AFFILIATION OF LOCAL SOCIETIES.

One of the most successful of the many new branches of work undertaken since the reconstruction of the Society in 1887 is the unification of local Horticultural Societies by a scheme of affiliation to the R.H.S. Since this was initiated no fewer than 200 Societies have joined our ranks, and the number is steadily increasing.

The Parent Society offers annually a Silver Challenge Cup to be competed for by Affiliated Societies. (See "Book of Schedules," under date October 13 and 14.)

To the privileges of Affiliated Societies have been added all the benefits accruing under the scheme recently introduced for the Union of Horticultural Mutual Improvement Societies.

Secretaries of Affiliated Societies can obtain on application a specimen of a Card which the Council have prepared for the use of Affiliated Societies for Certificates, Commendations, &c. Price 3*s*. 6*d*. for 10 copies, 5*s*. 6*d*. for 20, 11*s*. 6*d*. for 50, 20*s*. for 100.

The Council have also struck a special Medal for the use of Affiliated Societies. It is issued at cost price in Bronze, Silver, and Silver-gilt—viz. Bronze, 5*s*. 6*d*., with case complete; Silver, 12*s*. 6*d*., with case complete; Silver-gilt, 16*s*. 6*d*., with case complete. Award Cards having the Medal embossed in relief can be sent with the Medal if ordered, price 6*d*. each.

29. UNION OF HORTICULTURAL MUTUAL IMPROVEMENT SOCIETIES.

This Union has been established for the encouragement and assistance of Horticultural Mutual Improvement Societies, the object being to strengthen existing Societies, to promote interchange of lecturers, to provide printed lectures, and if possible to increase the number of these useful Societies.

A list of lecturers and their subjects, and also a list of typewritten lectures, with or without lantern slides, prepared by the Society, may be obtained from the Secretary R.H.S., price 3*d*.

Lantern slides on horticultural topics are much needed, and their gift will be appreciated.

30. COLOUR CHART.

Hardly a gardener or florist exists who has not at times longed for a COLOUR CHART—that is to say, for a standard of reference whereby he could himself name, or recognize, or convey to a friend at a distance, the *exact* shade of colour of a flower he desired to procure or had seen advertised, or wished to commend to a friend. Take, for example, the word "crimson"; what a multitude of colours and shades it may be made to include! Some, very beautiful; some, horrible concoctions of red and blue crudely combined.

The Council of the Society have long felt the need of such a Colour

Chart, but the huge expense of production has hitherto deterred them from issuing it.

Not long since an admirable chart, containing more than 1,450 shades of colour between white and black, was published at the instance of the French Chrysanthemum Society, the price being £1 1*s*. net, and by it it is now possible to *exactly* recognize or describe to a friend or purchaser at a distance the precise colour of any possible flower. You may have met with an Azalea, for instance, which greatly strikes your fancy; you take out your Chart and match its shade, and describe it to your friend or your nurseryman as, "Colour: Apricot, p. 53, shade 3," and he turns to his Chart and sees *exactly* what it is you want or describe. Or you want to make someone understand the exact shade of a rose in the way of "Andersoni," and you need only say, "Rosy pink, p. 118, shade 4," and your correspondent turns to his Chart and sees in a moment exactly what it is you want to describe. Or a nurseryman, having raised a new variety, can by simply quoting "Colour Chart, p. —, shade —," exactly represent to his customers the colour-beauty of his new introduction.

The Council recognizing both the excellence and the usefulness of this Chart, the idea at once occurred: Could it not be adopted as an International Standard, so that all lovers of flowers all over the world could accurately and exactly describe to one another (no matter how far away or speaking what language) the colour and shade of any particular flower they refer to? There seemed no other difficulty than the somewhat prohibitive cost of £1 1*s*. net. But difficulties only exist to be overcome, and by undertaking to be responsible for a very large number the Society is now in a position to offer this Chart to its Fellows at the reduced cost of 14*s*. 6*d*., for which price it can be obtained at the Society's Offices, Vincent Square, or it can be sent free by post for 15*s*.; but in all cases a cheque or postal order must be sent beforehand.

This Chart will, of course, be found vastly useful for many other purposes; for example, a lady wishing to match a certain shade has only to refer her dressmaker to such and such a colour on p. —, shade —, and it can be infallibly matched. An artist wishing to describe the colour of the sky on a certain sundown can do so exactly by reference to the Chart. And in many other like ways it must prove generally useful, containing as it does every possible shade of colour between black and white.

This Chart is being adopted extensively by dyers, mercers, drapers, and others, in all countries, as a result of its introduction through our Society.

A large and rapid sale has already been created, and the Council hope that Fellows will avail themselves freely of this offer, as there is now a real prospect of its being very widely adopted as a regular International standard. It should be quoted as "The Royal Horticultural Society's Colour Chart."

31. MONOGRAPH ON FUNGOID PESTS.

The attention of Fellows is directed to a handsome volume published by the Society on "Fungoid Pests of Cultivated Plants," by Dr. M. C. Cooke, V.M.H. It consists of 280 pages of letterpress, and is illustrated with 24 coloured plates, containing figures of 360 different fungoid attacks, and 23 woodcuts. It also contains a Chapter on Fungicides, which explains clearly how to make the different washes and sprays, and gives the proportions in which the various ingredients should be used. The whole work is written so as to interest and instruct the cultivator in the simplest and most practical manner. The volume makes an admirable school prize or gift to a gardener or student of nature. Price 5*s.*, R.H.S. Office, Vincent Square.

"No one whose plants are subject to fungoid attacks—and whose are not?—should be without this book; for not only can they by its use identify the disease at once, but they are also told both how to treat it and overcome it, and also how to make the different washes and sprays which the different classes of fungoid attacks require."

32. ALTERATIONS IN RULES FOR JUDGING—1909 CODE.

The "Rules for Judging, with Suggestions to Schedule Makers and Exhibitors," have again been further revised and considerably modified from the experience gained during the last few years. Special attention is drawn to the amended Rule defining "an amateur," with suggestions for establishing four distinct classes of amateurs to meet the requirements of larger or smaller local Societies. The "pointing" recommended for fruits and vegetables has also been considerably amended, and the terms "annuals" and "biennials" further explained. The secretaries of local Societies are advised to obtain a fresh copy. It will be sent post free on receipt of a postal order for 1*s.* 6*d.*, addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W.

Exhibitors of vegetables are specially warned that the numbers of specimens to a dish appearing on p. 19 of the revised Rules (1909 Code) have been still further modified, and will until further notice stand as follows:—

	Specimens		Specimens
Asparagus	36	Marrows	3
Beets	9	Mushrooms	12
Broad Beans	24	Onions	12
Broccoli	6	Parsnips	12
Brussels Sprouts	36	Peas	36
Cabbages	3	Potatos	12
Carrots	12	Radish	24
Cauliflower	6	Runner Beans	24
Celery	6	Seakale	12
Cucumber	2	Shallots, large bulbs	24
French and Climbing Beans	36	„ small clusters	3
Kale, whole stem, to show habit	3	Tomatos	12
Leeks	12	Turnips	12
Lettuce and Endive	6		

33. SPRAYING OF FRUIT TREES.

The Report of the Conference on the Spraying of Fruit Trees, held in the R.H.S. Hall on October 16, 1908, may still be obtained at the Society's Offices, Vincent Square, Westminster, price 1*s*. The book deals with the methods of spraying fruit trees for both insect and fungus pests, with information as to washes and spraying machinery, and forms the latest collated information on this subject.

34. VARIETIES OF FRUITS.

Many people plant Fruit trees without a thought of what Variety they shall plant, and as a result almost certain disappointment ensues, whilst for an expenditure of 2*d*. they can obtain from the Society a little 16-page pamphlet which contains the latest expert opinion on Apples, Pears, Plums, Cherries, Raspberries, Currants, Gooseberries, and Strawberries, together with Notes on Planting, Pruning, and Manuring, which for clearness of expression and direction it would be impossible to surpass. It has in fact been suggested that no other 16 pages in the English language contain so much and such definite information. At the end of the pamphlet are given the names of some of the newer varieties of Fruits, which promise well, but are not yet sufficiently proved to be recommended for general planting.

Copies of this pamphlet for distribution may be obtained at the Society's Office, Vincent Square, Westminster. Price, post free: single copy, 2*d*., or 25, 2*s*.; 50, 3*s*.; 100, 4*s*.

35. PLANTS CERTIFICATED.

The last published list of "Plants Certificated by the Society" commenced with the year 1859 and closed with 1899. A further 10 years has now passed and the Council have decided to republish the list up-to-date, constituting a record of all the plants which have received awards during the past 50 years. The completed list will be of welcome assistance to amateurs and an absolute necessity to raisers and introducers of new plants. It will be ready for issue about April, price 2*s*. post free.

36. INTERNATIONAL HORTICULTURAL EXHIBITION.

1912.

PRELIMINARY NOTICE.

The President and Council of the Royal Horticultural Society hope to organize an INTERNATIONAL HORTICULTURAL EXHIBITION in London, in 1912.

Definite dates and further particulars will be issued as soon as possible.

37. ADVERTISEMENTS.

Fellows are reminded that the more they can place their orders with those who advertise in the Society's Publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

FELLOWS' PRIVILEGES OF CHEMICAL ANALYSIS.

(Applicable only to the case of those Fellows who are not engaged in any Horticultural Trade, or in the manufacture or sale of any substance sent for Analysis.)

THE Council have fixed the following rates of charges for Chemical Analysis to Fellows of the Society being *bonâ fide* Gardeners or Amateurs.

These privileges are applicable only when the Analyses are for *bonâ fide* horticultural purposes, and are required by Fellows for their own use and guidance in respect of gardens or orchards in their own occupation.

The analyses are given on the understanding that they are required for the individual and sole benefit of the Fellow applying for them, and must not be used for the information of other persons, or for commercial purposes.

Gardeners, when forwarding samples, are required to state the name of the Fellow on whose behalf they apply.

The analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

When applying for an analysis, Fellows must be very particular to quote the number in the following schedule under which they wish it to be made.

No.		
1.	An opinion on the purity of bone-dust (each sample)	2*s.* 6*d.*
2.	An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged	5*s.*
3.	An analysis of guano, showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
4.	An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged	5*s.*
5.	An analysis of superphosphate of lime, dissolved bones, &c., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
6.	An analysis of bone-dust, basic slag, or any other ordinary artificial manure, together with an opinion as to whether it be worth the price charged	10*s.*
7.	Determination of potash in potash salts, compound manures, &c.	7*s.* 6*d.*
8.	An analysis of compound artificial manures, animal products, refuse substances used for manure, &c.	from 10*s.* to £1
9.	An analysis of limestone, showing the proportion of lime	7*s.* 6*d.*
10.	Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime	10*s.*
11.	Complete analysis of a soil	£3
12.	Analysis of any vegetable product	10*s.*
13.	Determination of the "hardness" of a sample of water before and after boiling	5*s.*
14.	Analysis of water of land-drainage, and of water used for irrigation	£1
15.	Analysis of water used for domestic purposes	£1 10*s.*
16.	Consultation by letter	5*s.*

Letters and samples (postage and carriage prepaid) should be addressed to the Consulting Chemist, Dr. J. AUGUSTUS VOELCKER, 22 Tudor Street, New Bridge Street, London, E.C.

The fees for analysis must be sent to the Consulting Chemist at the time of application.

Instructions for selecting, drawing, and sending samples for analysis will be found in the Society's "Book of Arrangements," or can be obtained on application to the Society's Office, Vincent Square, S.W.

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